HP 15 Notebook PC

Maintenance and Service Guide

Product notice

This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows functionality. See http://www.microsoft.com for details.

Software terms

By installing, copying, downloading, or otherwise using any software product preinstalled on this computer, you agree to be bound by the terms of the HP End User License Agreement (EULA). If you do not accept these license terms, your sole remedy is to return the entire unused product (hardware and software) within 14 days for a refund subject to the refund policy of your place of purchase.

For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

Important Notice about Customer Self-Repair Parts

⚠ **CAUTION:** Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, "Removal and replacement procedures for Customer Self-Repair parts," for details. Accessing parts described in Chapter 6, "Removal and replacement procedures for Authorized Service Provider only parts," can damage the computer or void your warranty.

Safety warning notice

⚠ WARNING!   To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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1 Product description

Category	Description
Product Name	HP 15 Notebook PC
Processors	Processors are attached to the system board. • Intel Core i3-4030U, 1.9 GHz, 1333 MHz/3 MB L2 cache, 15 W • Intel Core i3-4010U, 1.7 GHz, 1333 MHz/3 MB L2 cache, 15 W • Intel Core i3-4005U, 1.7 GHz, 1333 MHz/3 MB L2 cache, 15 W • Intel Pentium N3540, 2.16 GHz, turbo up to 2.66 GHz, 1333 MHz/2 MB L2 cache, 4.5 W • Intel Pentium N3530, 2.16 GHz, turbo up to 2.58 GHz, 1333 MHz/2 MB L2 cache, 4.5 W • Intel Celeron N2940, 1.83 GHz, turbo up to 2.25 GHz, 1333 MHz/2 MB L2 cache, quad SDP, 4.5 W • Intel Celeron N2840, 2.16 GHz, turbo up to 2.25 GHz, 1333 MHz/2 MB L2 cache, 4.5 W • Intel Celeron N2830, 1.83 GHz, turbo up to 2.41 GHz, 1333 MHz/2 MB L2 cache, 4.5 W
Chipset	Intel Bay Trail-M SoC Intel Shark Bay ULT One Chip Solution Intel Braswell SoC
Graphics	**Internal graphics:** • Intel HD Graphics 4400 (Core i3 processors) • Intel HD Graphics (Pentium and Celeron processors) Supports either HD Decode, DX11.1, and HDMI or HD Decode, DX11, and HDMI
Panel	15.6 in, white light-emitting diode (WLED), high-definition (HD), BrightView (1366×768) display, 3.6 mm, SVA; typical brightness: 200 nits All display assemblies include wireless local area network (WLAN) antenna cables 16:9 Ultra Wide Aspect Ratio Touchscreen, multi-touch enabled
Memory	Two SODIMM non-customer-accessible/upgradable memory module slots (Core i3 processors) DDR3L-1600 MHz dual channel support (DDR3L-1600 dual channel support) One SODIMM non-customer-accessible/upgradable memory module slot (Pentium, Celeron processors) DDR3L-1333 MHz dual channel support (DDR3L-1600 downgraded to DDR3L-1333) Supports up to 4 GB max system memory (DDR3L-1600 MHz module) Supports the following system RAM configurations: • 8192 MB (8192 MB×1 or 4096 MB×2) • 6144 MB (4096 MB×1 + 2048 MB×1) • 4096 MB (4096 MB×1 or 2048 MB×2) • 2048 MB (2048 MB×1)

Category	Description
Hard drive	Supports **6.35 cm** (2.5 in) hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses (all hard drives use the same bracket)
	Serial ATA
	Accelerometer/hard drive protection support
	Supports the following hard drives:
	• 750 GB, 5400 rpm, 9.5 mm
	• 500 GB, 5400 rpm, 9.5 mm and 7.0 mm
	• 320 GB, 5400 rpm, 9.5 mm and 7.0 mm
Optical drive	9.5 mm tray load, SATA, fixed
	DVD±RW Double-Layer SuperMulti Drive
	Zero power optical drive
	Supports M-Disc
Audio and video	HD audio
	Dual speakers
	VGA camera (fixed, no tilt with activity LED; 640×480 by 24 frames per second)
	HD camera (fixed, no tilt with activity LED; 1280×720 by 30 frames per second)
	Single digital microphone
Ethernet	Integrated 10/100 NIC
Wireless	Integrated wireless options with single antennas (HMC/PCIe)
	Support for the following WLAN formats:
	• Qualcomm Atheros AR9485 802.11bgn 1x1 Wi-Fi adapter
	• Realtek RTL8188EE 802.11bgn 1x1 Wi-Fi adapter
	• Realtek RT8723BE 802.11bgn 1x1 Wi-Fi+BT 4.0 Combo Adapter
	• Broadcom BCM43142 802.11bgn 1x1 Wi-Fi + BT 4.0 HMC Combo Adapter
	Compatible with Miracast-certified devices
	Wireless display support (WiFi direct)
External media cards	HP Multi-Format Memory Card Reader slot with push-push technology, supporting the following digital card formats:
	• Secure Digital (SD) Memory Card
	• Secure Digital High Capacity (SDHC) Memory Card
	• Secure Digital eXtended Capacity (SDXC) Memory Card
Ports	AC Smart Pin adapter plug (4.5 mm barrel)
	Combination audio-out (headphone)/audio-in (microphone)
	RJ-45 (Ethernet)
	USB 3.0 (2 ports), USB 2.0 (1 port)
	HDMI 1.4 output supporting 1920x1200 @ 60 Hz
Keyboard/ pointing devices	Full-size, textured island-style with black keyboard frame

Category	Description
	Multitouch gestures enabled
	Supports Windows® 8 Modern TrackPad Gestures
	Support PS/2 interface
Power requirements	Supports the following AC adapters:
	1 M length power cord
	45 W HP Smart AC adapter (3-wire, 4.5 mm barrel)
	Supports the following batteries:
	● 4 cell, 41 Whr, 2.8 AH
	● 3 cell, 31 Whr, 2.8 AH
Security	Kensington Security Lock
	TPM 2.0 (SharkBay and Braswell)
Operating system	**Preinstalled:**
	Windows 10
	Windows 8.1 with Bing image (64 bit)
	Windows 8.1
Serviceability	**End user replaceable parts:**
	AC adapter
	Battery
	Keyboard (select model replacement only)
	Memory module
	Optical drive
	Hard drive
	WLAN module

2 External component identification
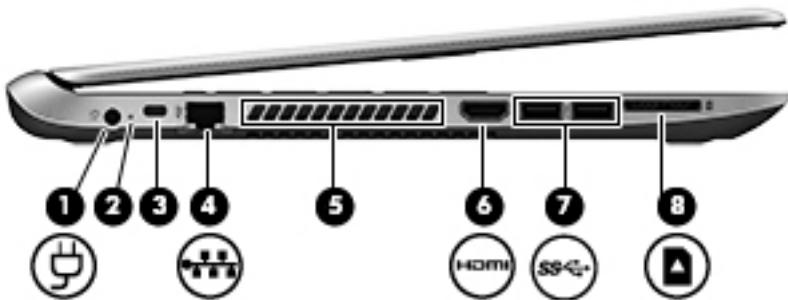
Right side

Component		Description
(1)	Power light	- On: The computer is on. - Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. - Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)	Hard drive or eMMC light	Blinking white: The hard drive or eMMC is being accessed.
(3)	Audio-out (headphone) jack/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety and Environmental Notices.* To access this document: **Windows 8.1:** From the Start screen, type `support`, and then select the **HP Support Assistant** app. – or – From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar. **Windows 10:** Select **Start**, select **All apps**, select **HP Help and Support**, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.

Component		Description
		NOTE: Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(4)	⟵⟶	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(5)		Optical drive (select models only)	Depending on your computer model, reads an optical disc or reads and writes to an optical disc.
			NOTE: For disc compatibility information, go to the Help and Support web page. Follow the web page instructions to select your computer model. Select **Drivers & Downloads**, and then follow the on-screen instructions.
			In **Windows 10**, type `help` in the taskbar search box, select **Help and Support**, and then type `disc compatibility` in the search box.

Left side

Component		Description
(1)	(power connector icon)	Power connector	Connects an AC adapter.
(2)		AC adapter light	● On: The AC adapter is connected and the battery is charged. ● Off: The computer is using battery power.
(3)		Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(4)	(RJ-45 icon)	RJ-45 (network) jack/status lights	Connects a network cable. ● White: The network is connected. ● Amber: Activity is occurring on the network.
(5)		Vent	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Component		Description
(6)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(7)	USB 3.0 ports	Connect optional USB devices, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(8)	Memory card reader	Reads optional memory cards that store, manage, share, or access information.
		To insert a card:
		● Hold the card label-side up, with connectors facing the slot, insert the card into the slot, and then push in on the card until it is firmly seated.
		To remove a card:
		● Press in on the card until it pops out.

Display

Component		Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on. **NOTE:** The internal display switch is not visible from the outside of the computer.
(2)	Internal microphone	Records sound. **NOTE:** Select models have two microphone holes.
(3)	Webcam light	On: The webcam is in use.

Component		Description
(4)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.
		To use the webcam in **Windows 8.1**, from the Start screen, type `camera`, and then select **Camera** from the list of applications.
		To use the webcam in **Windows 10**, type `camera` in the taskbar search box, and then select **Camera**.
(5)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this document in **Windows 8.1**:

From the Start screen, type `support`, and then select the **HP Support Assistant** app.

– or –
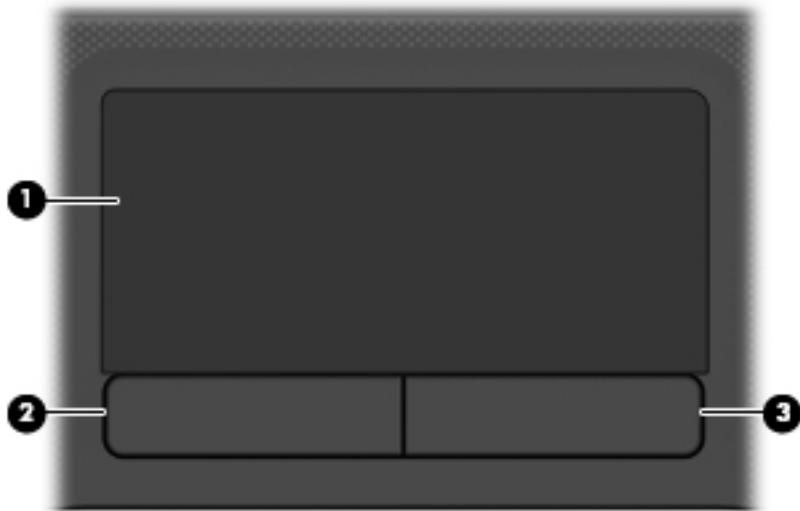
From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

To access this document in **Windows 10**:

Select **Start**, select **All apps**, select **HP Help and Support**, and then select **HP Documentation**.
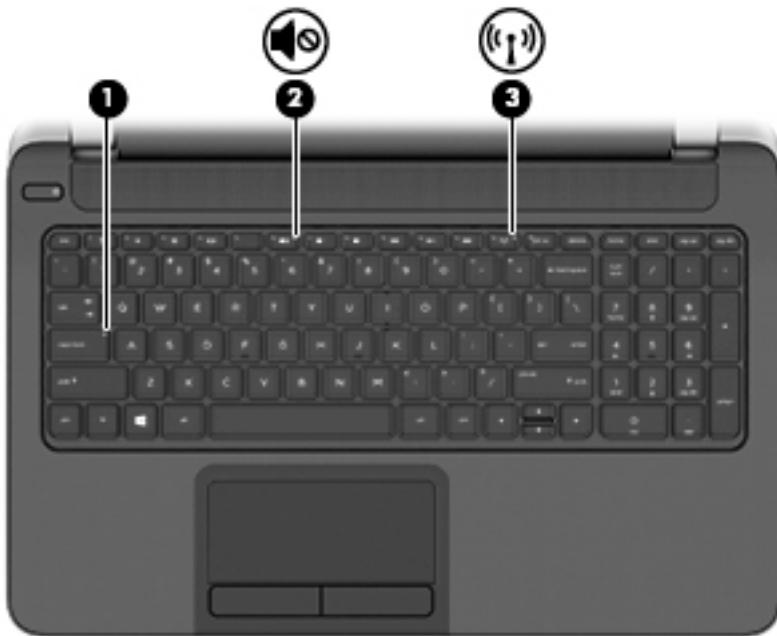
Top

TouchPad

Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen. **NOTE:** The TouchPad also supports edge-swipe gestures.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights

Component		Description
(1)		Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(2)	Mute light	- Amber: Computer sound is off. - Off: Computer sound is on.
(3)	Wireless light	On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth device, is on. **NOTE:** On some models, the wireless light is amber when all wireless devices are off.
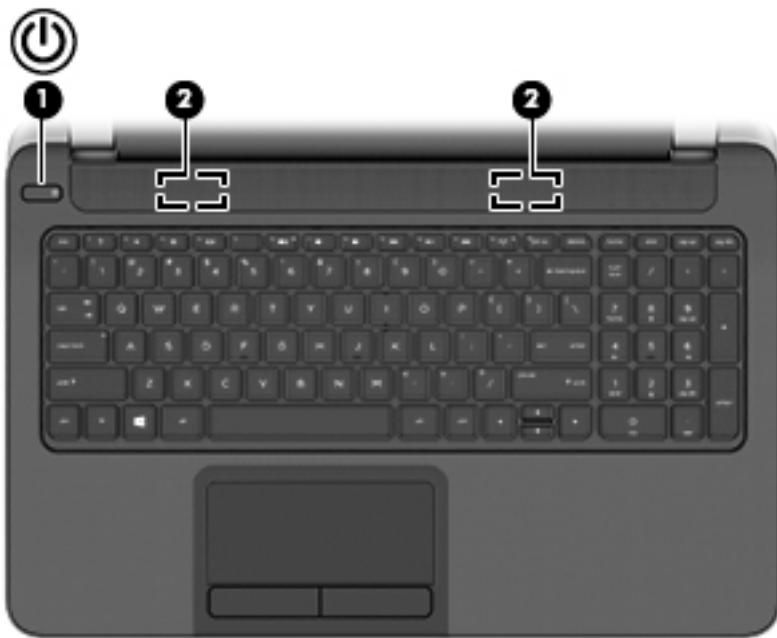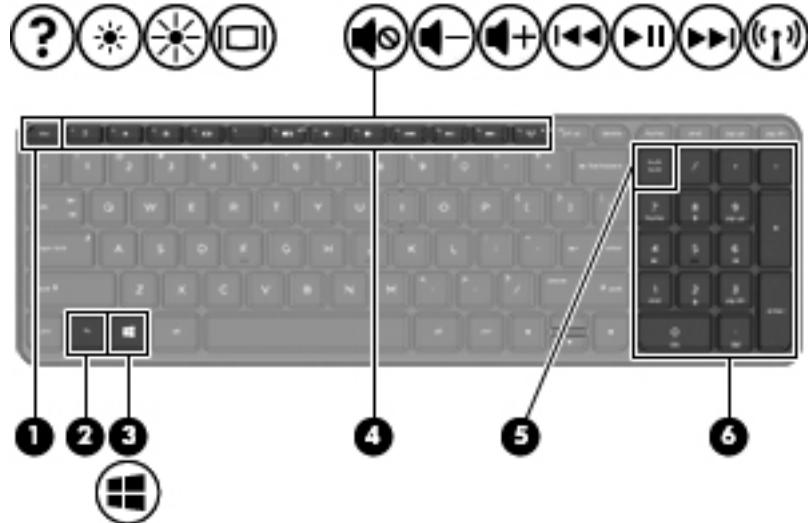
Buttons and speakers

Component		Description
(1) ⏻	Power button	• When the computer is off, press the button to turn on the computer.
		• When the computer is on, press the button briefly to initiate Sleep.
		• When the computer is in the Sleep state, press the button briefly to exit Sleep.
		• When the computer is in Hibernation, press the button briefly to exit Hibernation.
		CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.
		If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.
		To learn more about your power settings, see your power options.
		Windows 8.1::
		▲ From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications.
		– or –
		From the Windows desktop, right-click the **Start** button, and then select **Power Options**.
		Windows 10:
		▲ Type `power` in the taskbar search box, and then select **Power and sleep settings**.
		– or –
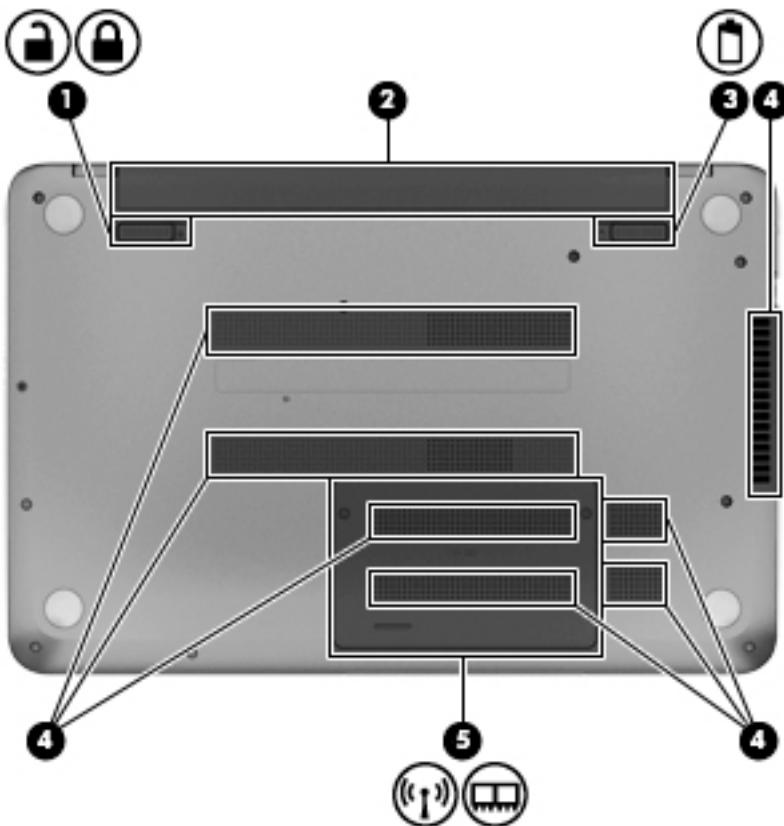
Component	Description
	Right-click the **Start** button, and then select **Power Options**.
(2) Speakers	Produce sound.

Keys

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the esc key or, on select models, the spacebar.
(3)	Windows key	**Windows 8.1:** Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Pressing the Windows key again will return you to the previous screen. **Windows 10:** Opens the Start menu. **NOTE:** Pressing the Windows key again will close the **Start** menu.
(4)	Action keys	Execute frequently used system functions.
(5)	num lock key	Turns the integrated numeric keypad on and off. **NOTE:** The keypad function that is active when the computer is turned off is reinstated when the computer is turned back on.
(6)	Integrated numeric keypad	When num lock has been enabled, it can be used like an external numeric keypad.

Bottom

Component		Description
(1)	Battery lock	Locks and unlocks the battery in the battery bay.
(2)	Battery bay	Holds the battery.
(3)	Battery release latch	Releases the battery.
(4)	Vents (6)	Enable airflow to cool internal components.
		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	Service door	Provides access to the wireless LAN (WLAN) module slot and the memory module slots.

Component	Description
	CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact support through Help and Support. In **Windows 8.1**, from the Start screen, type `h`, and then select **Help and Support**. In **Windows 10**, type `support` in the taskbar search box, and then select the **HP Support Assistant** app. – or – Click the question mark icon in the taskbar.

Locating system information

Important system information is located on the bottom edge of the tablet or on the keyboard base. You may need the information when travelling internationally or when you contact support:

(1): Serial number

(2): Product number

(3): Model number

(4): Warranty period

Using Windows, briefly press the fn+esc key combination to display the System Information screen, which provides the product name and serial number of your computer, as well as information about the memory, processor, BIOS, and keyboard.
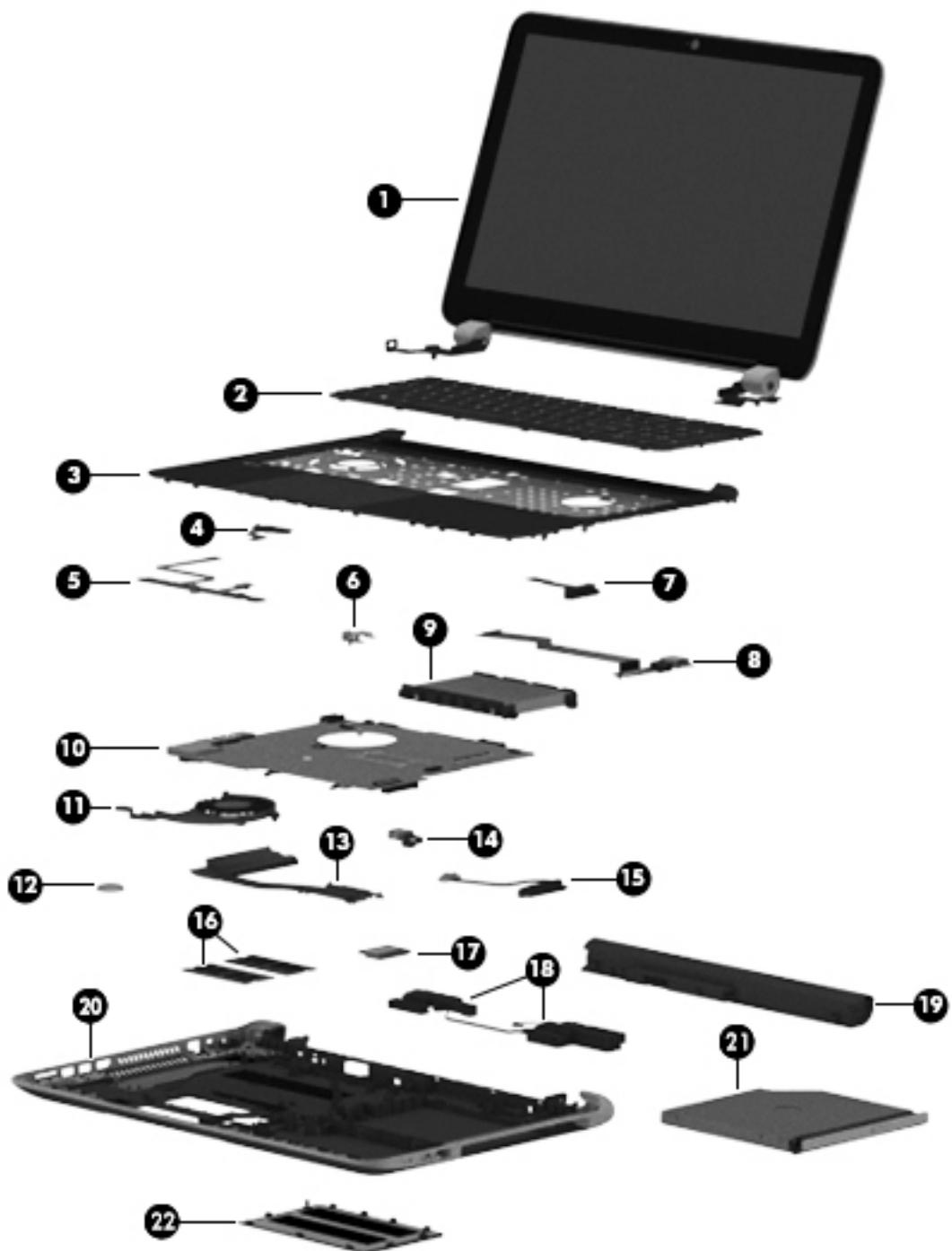
3   Illustrated parts catalog

Computer major components

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Locating system information on page 14 for details.
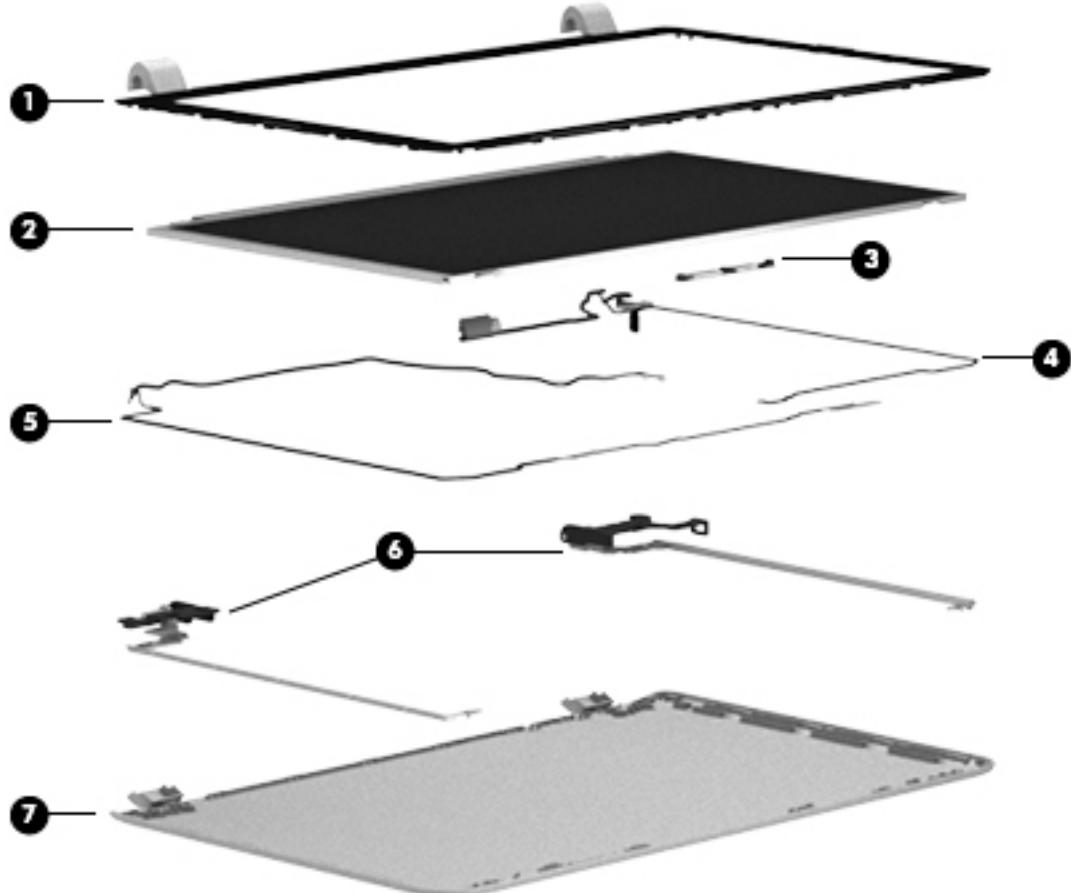
Item	Component	Spare part number
(1)	**Display assembly**: For display assembly subcomponent level spare part information, see Display assembly subcomponents on page 19.	not spared
	Display assembly, touch screen	783120-001
	Display assembly, touch screen with HD webcam	790204-001
	Display assembly, touch screen, eDP	828162-001

| Item	Component	Spare part number
(2)	**Keyboard** (includes keyboard cable):	
	For use in Canada	776778-DB1
	For use in Latin America	776778-161
	For use in the United States	776778-001
(3)	**Top cover** (includes TouchPad board and cable):	
	Black	776785-001
	Red	832758-001
	Silver	836863-001
(4)	**Power button board** (includes cable)	776780-001
(5)	**TouchPad button board** (includes cable)	732078-001
(6)	Power connector bracket is available with the power connector (spare part number 732067-001)	
(7)	Optical drive connector cable is available with the optical drive (spare part number 779456-001)	
(8)	**Audio/USB board**	732077-001
(9)	**Hard drive** (does not include hard drive connector cable or hard drive rubber bracket):	
	750 GB, 5400 rpm	778190-001
	500 GB, 5400 rpm	669299-001
	Hard Drive Hardware Kit (not illustrated, includes hard drive rubber bracket, 2 hard drive retention brackets, and hard drive connector cable).	732071-001
(10)	**System board** (includes replacement thermal material):	
	All system boards use the following part numbers:	
	xxxxxx-001: Non-Windows operating systems	
	xxxxxx-501: Windows 8.1 Standard operating system	
	xxxxxx-601: Windows 8.1 Professional or Windows 10 operating system	
	Models with a hard drive and optical drive:	
	System board with Intel Core i3-4030U processor	790202-001, -501
	System board with Intel Core i3-4010U processor	782103-001, -501
	System board with Intel Core i3-4005U processor	782101-001, -501
	System board with Intel Pentium N3540 processor	786901-001, -501
	System board with Intel Pentium N3540 processor (eDP models)	828166-001, -601
	System board with Intel Pentium N3530 processor	782100-001, -501
	System board with Intel Celeron N3150 processor (eDP models)	828169-001, -601
	System board with Intel Celeron N3050 processor (eDP models)	828168-001, -601
	System board with Intel Celeron N2940 processor	804044-001, -501
	System board with Intel Celeron N2940 processor (eDP models)	828165-001, -601
	System board with Intel Celeron N2920 processor	792575-001, -501

Item	Component	Spare part number
	System board with Intel Celeron N2840 processor	786899-001, -501
	System board with Intel Celeron N2840 processor (eDP models)	828164-001, -601
	System board with Intel Celeron N2830 processor	779457-001, -501
	System board with Intel Celeron N2820 processor	789103-001, -501
	System board with Intel Celeron N2815 processor	789101-001, -501
	System board with Intel Celeron N2805 processor	787077-001, -501
	Models with a hard drive and no optical drive:	
	System board with Intel Core i3-4030U processor	790201-001, -501
	System board with Intel Core i3-4010U processor	782104-001, -501
	System board with Intel Core i3-4005U processor	782102-001, -501
	System board with Intel Pentium N3540 processor	786900-001, -501
	System board with Intel Pentium N3530 processor	782106-001, -501
	System board with Intel Celeron N2920 processor	792574-001, -501
	System board with Intel Celeron N2840 processor	786898-001, -501
	System board with Intel Celeron N2830 processor	782105-001, -501
	System board with Intel Celeron N2820 processor	789102-001, -501
	System board with Intel Celeron N2815 processor	789100-001, -501
	System board with Intel Celeron N2805 processor	787076-001, -501
(11)	**Fan**	732068-001
(12)	**RTC battery**	697917-001
(13)	**Heat sink assembly** (includes replacement thermal material):	
	For computers with Intel Core processors	742581-001
	For computers with Intel Pentium N3540, Celeron N2940, and Celeron N2840 processors	749040-001
	For computers with Intel Celeron N3150 and N3050 processors	828173-001
(14)	**Power connector** (includes bracket):	732067-001
(15)	**Hard drive connector cable** is available in the hardware kit, part number 732071-001	
(16)	**Memory modules** (2, PC3L, 12800, 1600-MHz):	
	2 GB memory module	691739-001
	4 GB memory module	691740-001
	8 GB memory module	693374-001
(17)	**WLAN module:**	
	Ralink RT3290LE 802.11 bgn 1×1 Wi-Fi and Bluetooth 4.0 combo adapter	690020-001
	Realtek RTL8188EE 802.11bgn Wi-Fi Adapter for use on all computer models	709848-001
	Broadcom BCM43142 802.11 bgn 1x1 Wi-Fi + BT4.0 HMC Combo Adapterr	753076-001

Item	Component	Spare part number
(18)	**Speakers** (include, speaker cables, and 4 rubber isolators)	732084-001
(19)	**Li-ion battery**	
	4 cell, 41 Wh, 2.8 Ah	752237-001
	3 cell, 31 Wh, 2.8 Ah	776622-001
(20)	**Base enclosure** (includes battery release latch mechanism and RJ-45 cover)	
	For use in models with an optical drive	776772-001
	For use in models without an optical drive	777664-001
(21)	**DVD±RW Double-Layer SuperMulti Drive** (includes cable, bezel, bracket, and screws)	779456-001
(22)	**Service door** (part of the plastics kit 776781-001)	

# Display assembly subcomponents
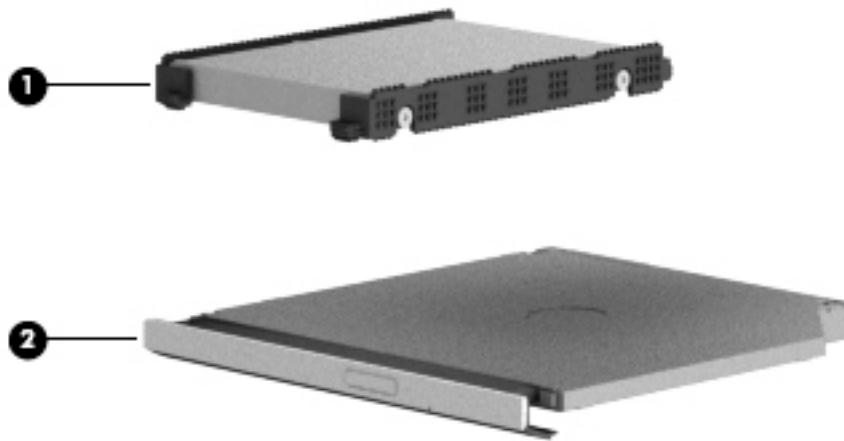
Item	Component	Spare part number
(1)	**Display bezel** (includes 2 rubber screws)	776774-001
(2)	**Raw display panel** (includes 2 rubber screw covers)	

Item	Component	Spare part number
	HD, BrightView	732080-001
	HD, BrightView, eDP	828163-001
(3)	**Webcam/microphone module** (includes adhesive)	776787-001
	HD webcam/microphone module (includes adhesive)	790203-001
(4)	**Display panel cable** (includes webcamera/microphone module cable and two rubber screws)	
	For use in models without eDP displays	732066-001
	For use in models with eDP displays	828161-001
(5)	**Antenna Kit** (includes left and right wireless antenna cables and transceivers and 2 rubber screws)	776770-001
(6)	**Display Hinge Kit** (includes left and right hinges and 2 rubber screws):	732072-001
(7)	**Display back enclosure** (includes 2 rubber screw covers):	
	Black	776771-001
	Red	832757-001
	Silver	836862-001

Miscellaneous parts

Component	Spare part number
45 W HP Smart AC adapter (nPFC, RC, 3-wire, 4.5 mm)	741727-001
Power cord (3-pin, black, 1.00 m)	
For use in Denmark	755530-081
For use in Europe	755530-021
For use in the United Kingdom	755530-031
For use in the United States	755530-001
Screw Kit	776782-001
HDMI to VGA Adapter	701943-001
HP USB flash drive, 8 GB	786830-001
HP USB flash drive, 8 GB, black	829843-001

Mass storage devices

Item	Component	Spare part number
(1)	**Hard drive** (does not include the hard drive rubber bracket, hard drive connector cable, or screws)	
	750 GB 5400 rpm	778190-001
	500 GB 5400 rpm	669299-001
	Hard Drive Hardware Kit, includes:	732071-001
	Hard drive rubber bracket	
	Hard drive connector cable	
	Hard drive screws (2, not illustrated)	
(2)	**DVD±RW Double-Layer SuperMulti Drive** (includes optical drive hardware kit with optical drive bezel, bracket, connector cable, and screws)	779456-001

4 Removal and replacement procedures preliminary requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers

Service considerations

The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

NOTE: As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic

Cables and connectors

⚠ **CAUTION:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

⚠ **CAUTION:** Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE."

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

⚠ **CAUTION:** To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠ **CAUTION:** A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels			
	Relative humidity		
Event	10%	40%	55%
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.

- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.

- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.

- Place items on a grounded surface before removing items from their containers.

- Always be properly grounded when touching a component or assembly.

- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.

- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.

- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.

- When fixtures must directly contact dissipative surfaces, use fixtures made only of static safe materials.

- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.

- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.

- Avoid contact with pins, leads, or circuitry.

- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.

- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5 Removal and replacement procedures for Customer Self-Repair parts

NOTE: The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

NOTE: Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Locating system information on page 14 for details.

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

There are as many as 12 screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Battery
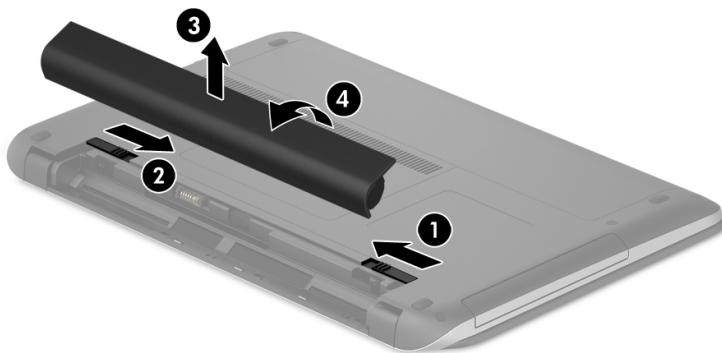
Description	Spare part number
4 cell, 41-Wh, 2.8-Ah, Li-ion battery	752237-001
3 cell, 31 Wh, 2.8-Ah, Li-ion battery	776622-001

Before disassembling the computer, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

Remove the battery:

1. Turn the computer upside down on a flat surface.

2. Firmly slide the release latch **(1)** to unlock the battery and slide the battery release latch **(2)** to release the battery.

3. Lift the battery **(3)** from the middle and then pivot it outward **(4)** to remove it from the computer.

To insert the battery:
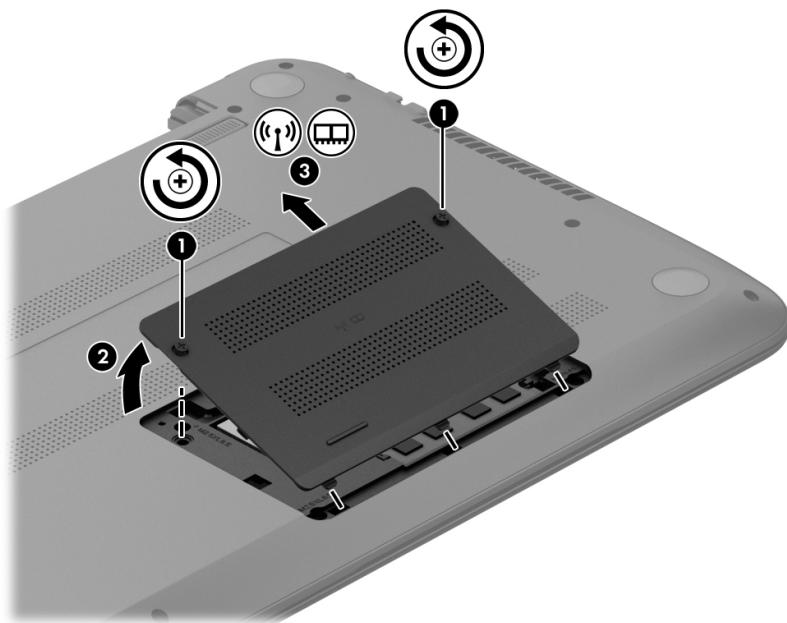
⚠ **CAUTION:** Do not slant the battery as you insert it. Slide the battery in straight.

1. Holding the battery in the middle, slide the battery **(1)** straight into the computer until the battery release latch locks into place.

2. Reset the battery lock **(2)** to the locked position.

Service door

Description	Spare part number
Service door is available with the plastics kit.	776781-001

1. Using a small Phillips screwdriver, loosen the service door screws **(1)**.
2. Lift the door **(2)**.
3. Slide the service door **(3)** forward to remove.

Memory module

Description	Spare part number
8 GB memory module (PC3, 12800, 1600-MHz)	693374-001
4 GB memory module (PC3, 12800, 1600-MHz)	691740-001
2 GB memory module (PC3, 12800, 1600-MHz)	691739-001

Before removing a memory module, follow these steps:
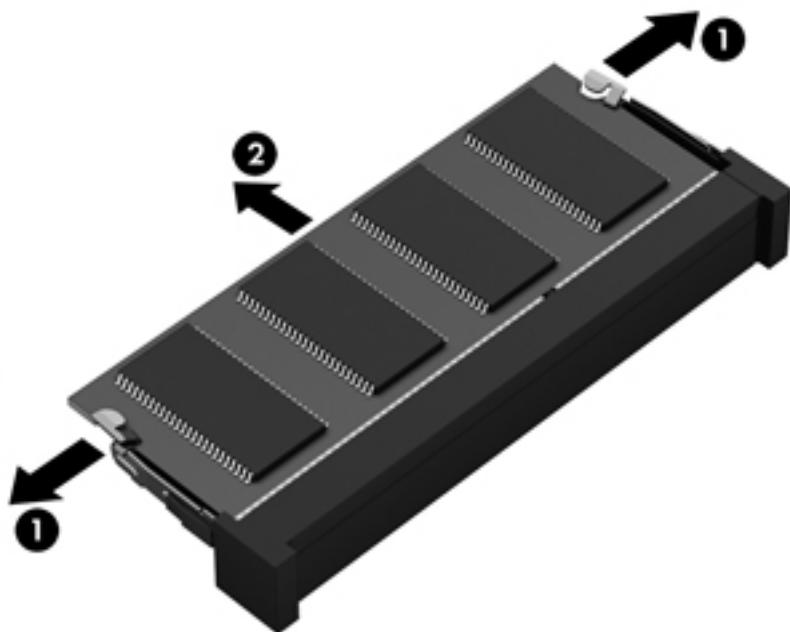
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28).

5. Remove the service door (see Service door on page 29).

Remove the memory module:

NOTE: Note the location of the memory module. If you are replacing it, install the new memory module in the same slot.

1. Spread the two retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)

2. Remove the memory module **(2)** by pulling it away from the slot at a 45 degree angle.

Reverse this procedure to install the memory module.
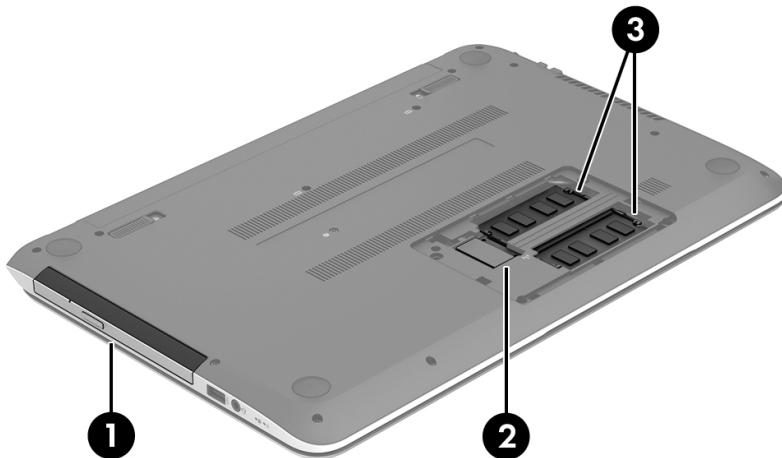
WLAN module

Description	Spare part number
Ralink RT3290LE 802.11 bgn 1×1 Wi-Fi and Bluetooth 4.0 combo adapter	690020-001
Realtek RTL8188EE 802.11 bgn Wi-Fi adapter	709848-001
Broadcom BCM43142 802.11 bgn 1x1 Wi-Fi + BT4.0 HMC Combo Adapter	753076-001

⚠ **CAUTION:**   To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28).

5. Remove the service door (see Service door on page 29).

6. Locate the WLAN module **(2)**.
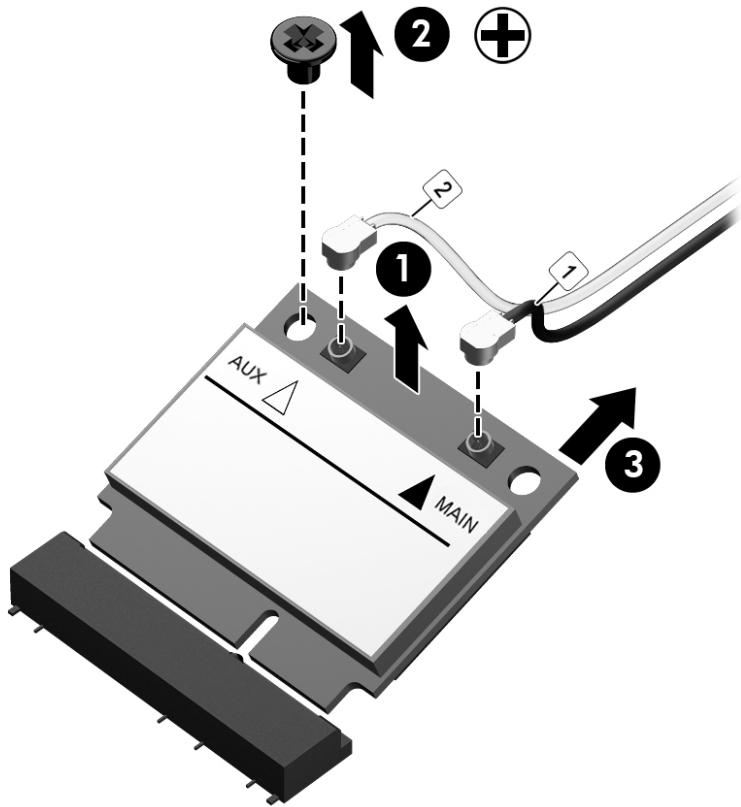
Remove the WLAN module:

1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.
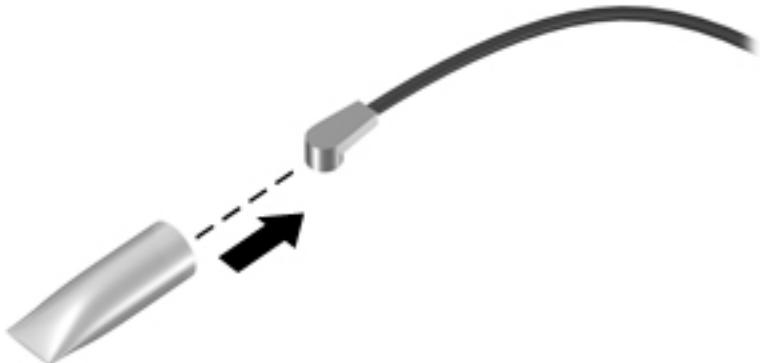
📝 **NOTE:**   The #1 WLAN antenna cable is connected to the WLAN module "Main" terminal. The #2 WLAN antenna cable is connected to the WLAN module "Aux" terminal.

2. Remove the Phillips M2.0×2.5 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

3. Remove the WLAN module **(3)** by pulling the module away from the slot at an angle.

NOTE: If the WLAN antennas are not connected to the terminals on the WLAN module, the protective sleeves should be installed on the antenna connectors, as shown in the following illustration.

Reverse this procedure to install the WLAN module.

Optical drive

**NOTE:** The optical drive spare part kit includes a bezel and bracket.
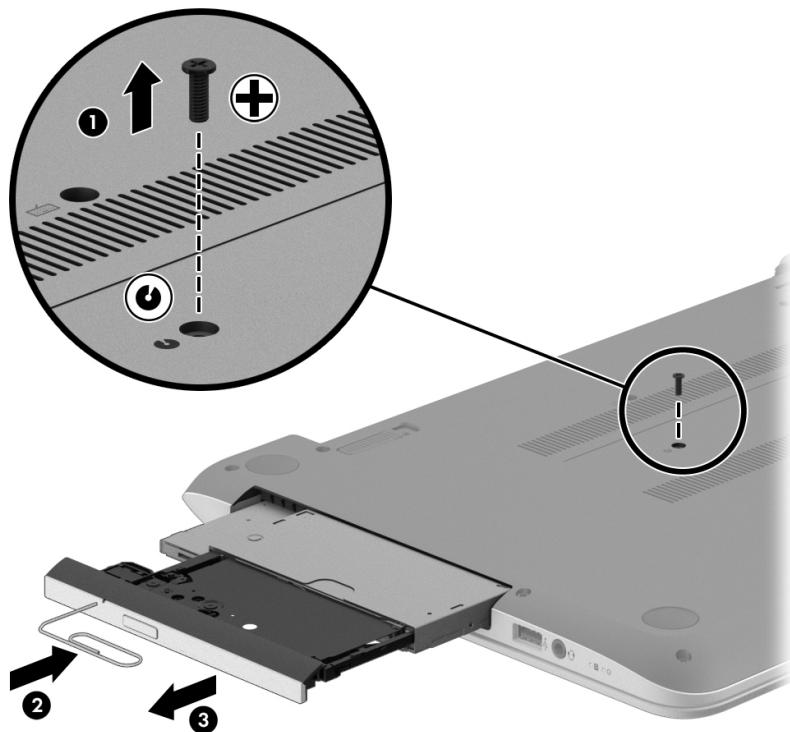
Description	Spare part number
DVD±RW Double-Layer SuperMulti Drive (includes bezel, bracket, cable, and screws)	779456-001

Before removing the optical drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see).
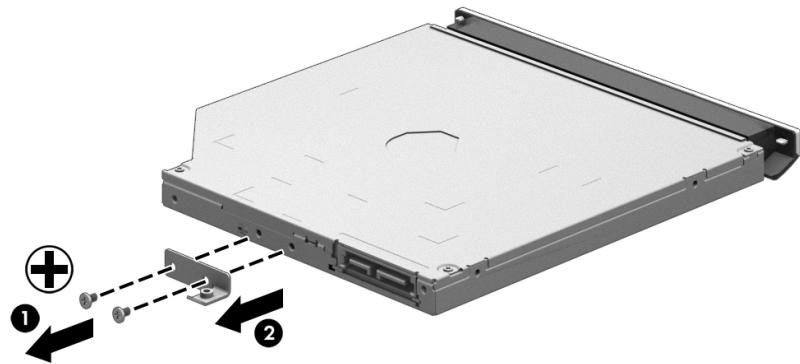
Remove the optical drive:

1. Using a small Phillips screwdriver, remove the Phillips M2.5×6.5 screw that secures the optical drive to the computer **(1)**.

2. Using the screwdriver, push on the rear of the CD/DVD drive to disconnect it from the computer

3. If necessary, use an unbent paperclip and press in gently on the paper clip **(2)** until the disc tray releases. Pull the tray **(3)** out from the front until the optical drive is completely removed from the computer.
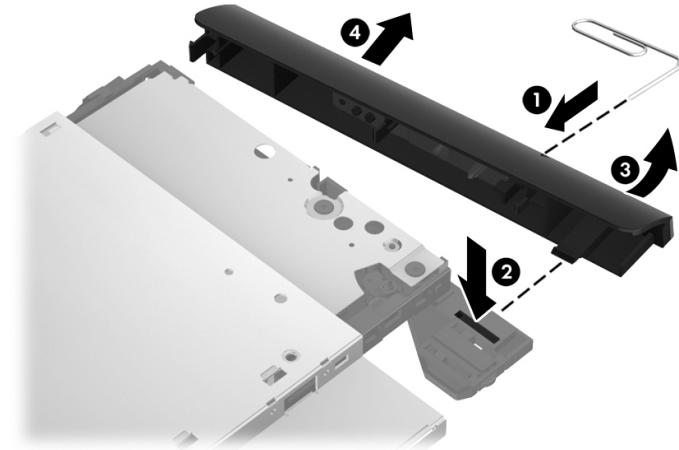

If it is necessary to replace the optical drive bracket and bezel, position the optical drive with the rear panel toward you.

1. Remove the two Phillips screws from the optical drive **(1)** and remove the bracket **(2)**.

2. Use an unbent paperclip and press in gently on the paper clip **(1)** and release from the tab **(2)** until the disc tray releases. Tilt the tray **(3)** and pull the bezel **(4)** to remove it.

Reverse this procedure to reassemble and install the optical drive.

6 Removal and replacement procedures for Authorized Service Provider parts

CAUTION: Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Locating system information on page 14 for details.

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

There are as many as 62 screws that must be removed, replaced, and/or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Display panel

📝 **NOTE:** These procedures are for replacing the display panel for HP Pavilion Notebook. For procedures to replace the HP Pavilion Notebook display assembly subcomponents, see Display assembly on page 65.

Description	Spare part number
Display bezel	776774-001
Display panel, raw (HD, BrightView)	732080-001
Display panel, raw (HD, BrightView, eDP)	828163-001

📝 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement
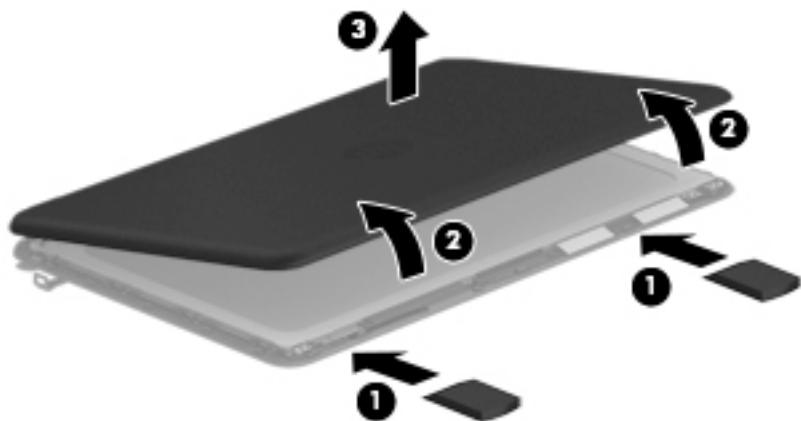
Before removing the display panel, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28).
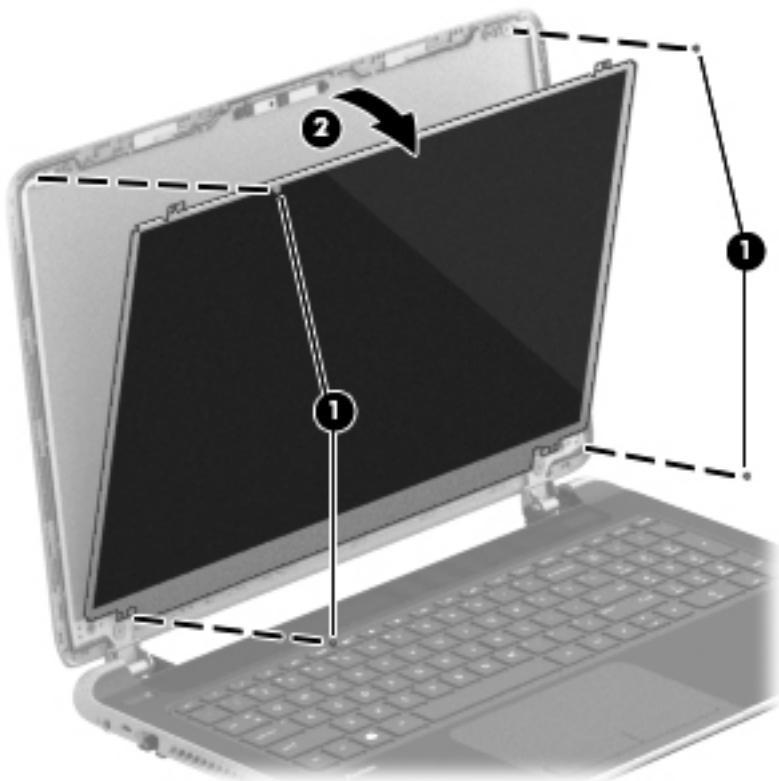
Remove the panel:

If it is necessary to replace the display bezel or any of the display assembly subcomponents:
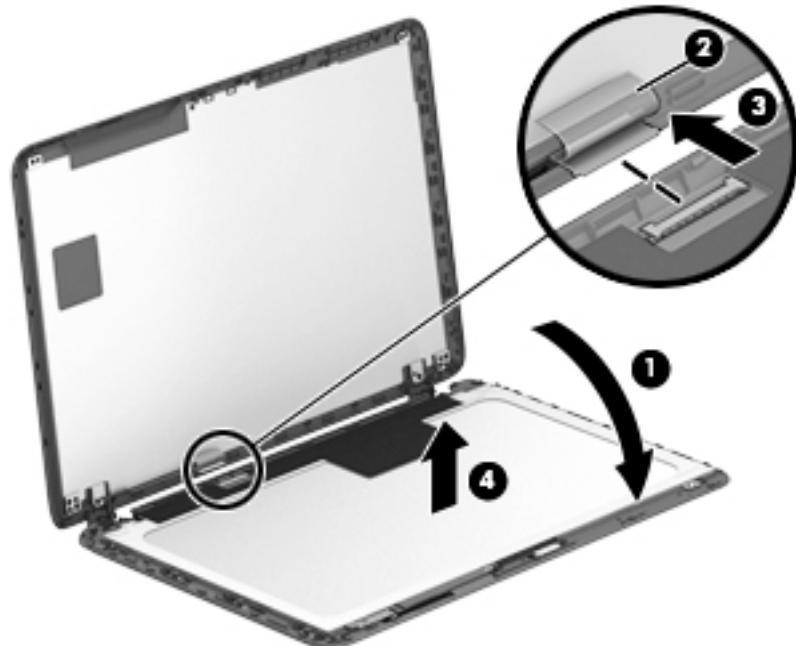
1. Remove the plastic screw covers **(1)** and the two Phillips M2.5×3.0 screws **(2)** that secure the display bezel to the display assembly.

2. If it is necessary to replace the display bezel or any of the display assembly subcomponents:

   a. Flex the inside edges of the bottom edge **(3)**, the left and right sides **(4)**, and the top edge **(5)** of the display bezel until the bezel disengages from the display enclosure.

   b. Remove the display bezel **(6)**.

c. Remove the four Phillips M2.0×2.5 screws **(1)** and carefully move the display panel **(2)** to the keyboard .

d. Release the tab **(1)** and disconnect the connector **(2)**. Lift the panel **(3)** to remove it.

Reverse this procedure to replace the panel.

Keyboard

**NOTE:** The keyboard spare part kit includes a keyboard cable.
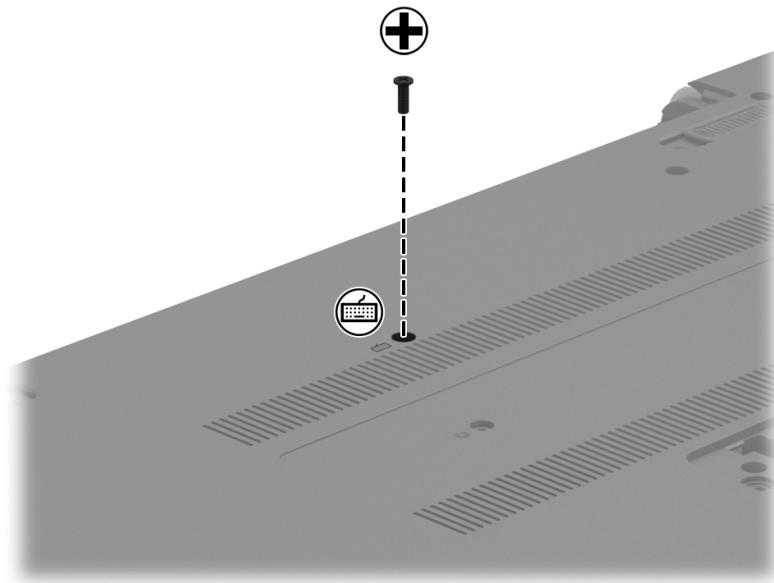
Description	Spare part number
Keyboard for use in Canada	776778-DB1
Keyboard for use in Latin America	776778-161
Keyboard for use in the United States	776778-001

Before removing the keyboard, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28).
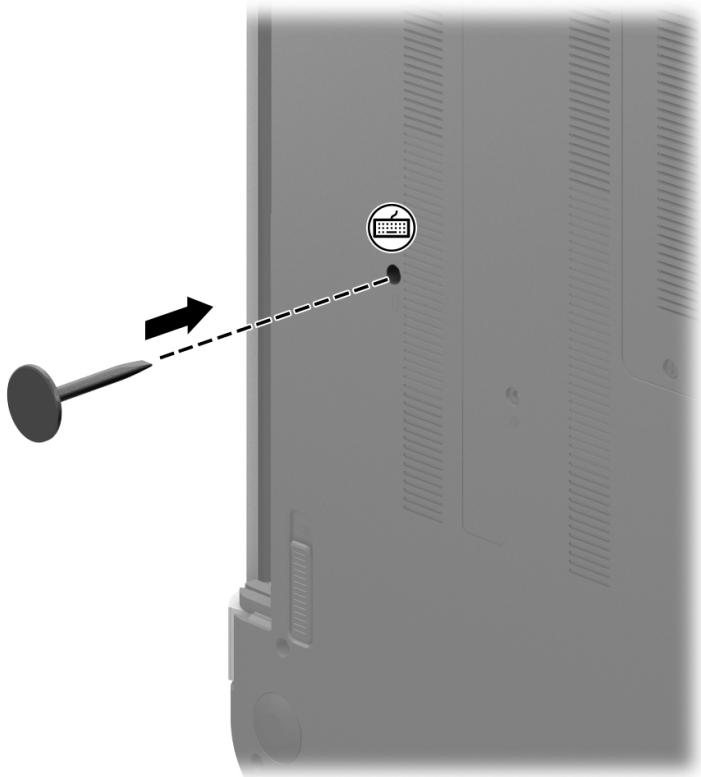
Remove the keyboard:

1. Remove the Phillips M2.5×6.5 screw that secures the keyboard to the computer.

2. Rest the computer on its left side.

3. Open the computer.
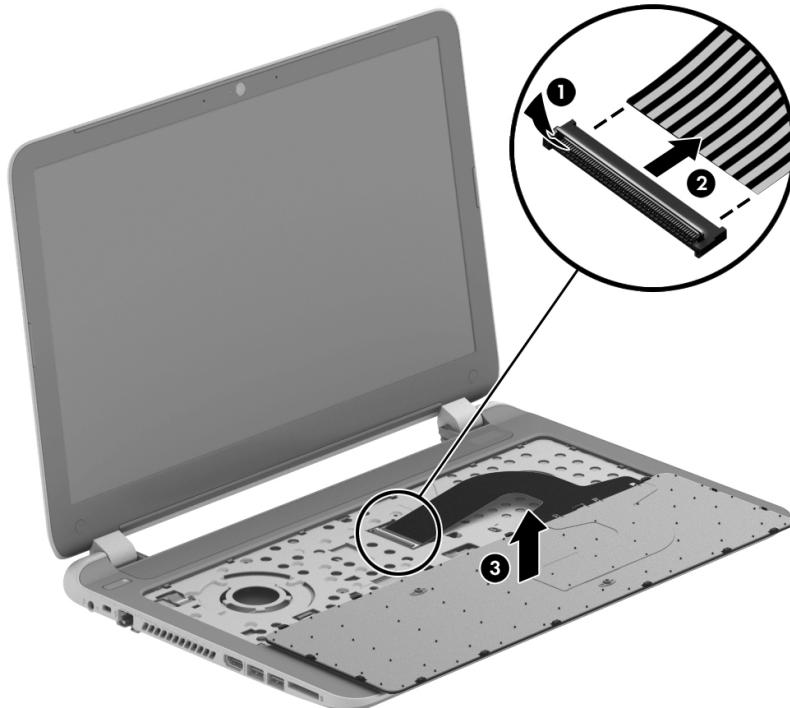
4. Insert a thin tool or a keyboard push tool into the keyboard screw hole, and then press on the back of the keyboard until the keyboard disengages from the computer.

5. Turn the computer right-side up with the front toward you.

6. Gently slide your finger along the top edge of the keyboard to release the keyboard clips **(1)**. Lift the rear edge of the keyboard **(2)**, and then swing the keyboard up and forward until it rests upside down on the palm rest.

7. Release the ZIF connector **(1)** by lifting the connector tab to which the keyboard cable is connected, and then disconnect the keyboard cable **(2)** from the system board.

8. Remove the keyboard **(3)**.

Reverse this procedure to install the keyboard.

Top cover

NOTE: The top cover spare part kit includes the TouchPad buttons, TouchPad board and TouchPad cable.

Description	Spare part number
Top cover for use in black models	776785-001
Top cover for use in red models	832758-001
Top cover for use in silver models	836863-001

IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement
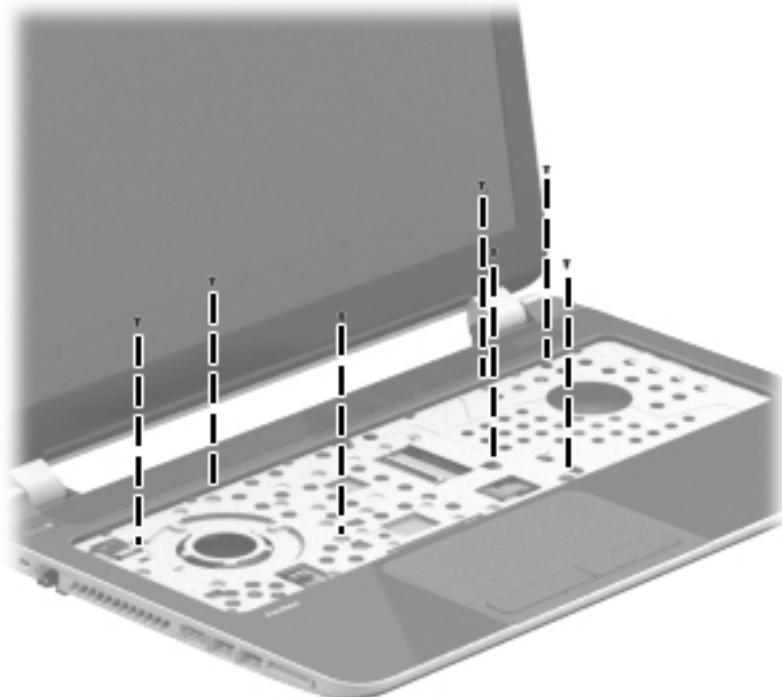
Before removing the top cover, follow these steps:

1. Shut down the computer.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see), and then remove the following components:
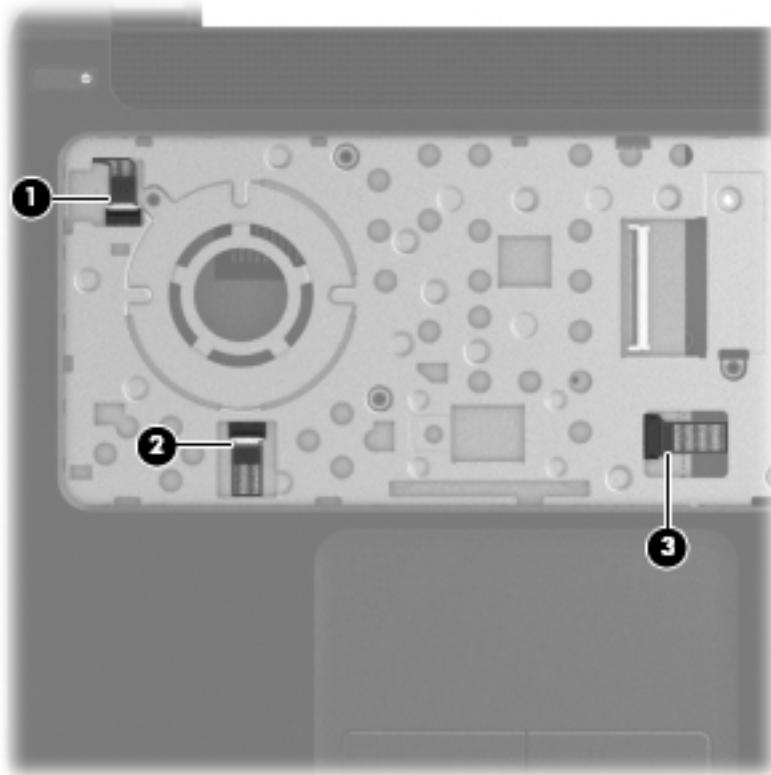
a. Optical drive (see Optical drive on page 33).

b. Remove the service door (see Service door on page 29).

c. Remove the WLAN module (see WLAN module on page 31).

d. Remove the memory module (see Memory module on page 30).

**e.** Keyboard (see Keyboard on page 38).

Remove the top cover:
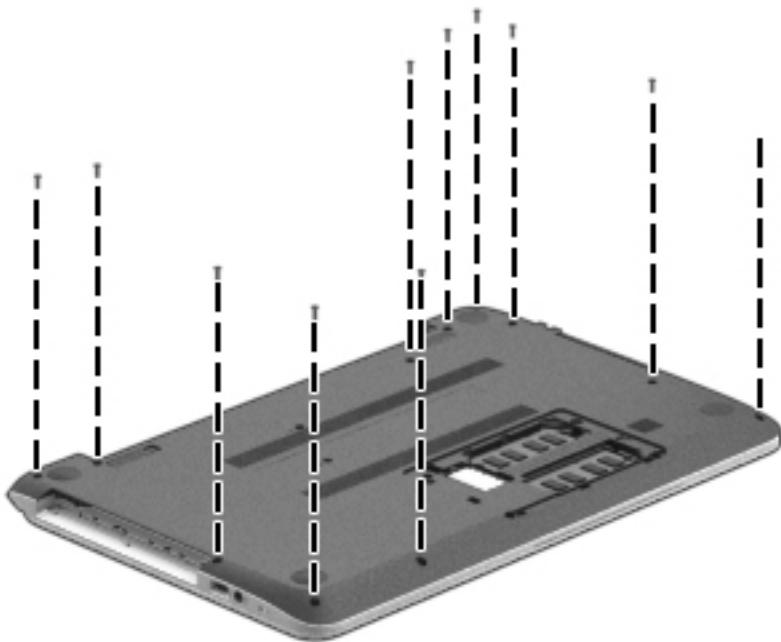
**1.** Remove the five Phillips M2.5×3.0 screws that secure the top cover to the base enclosure.
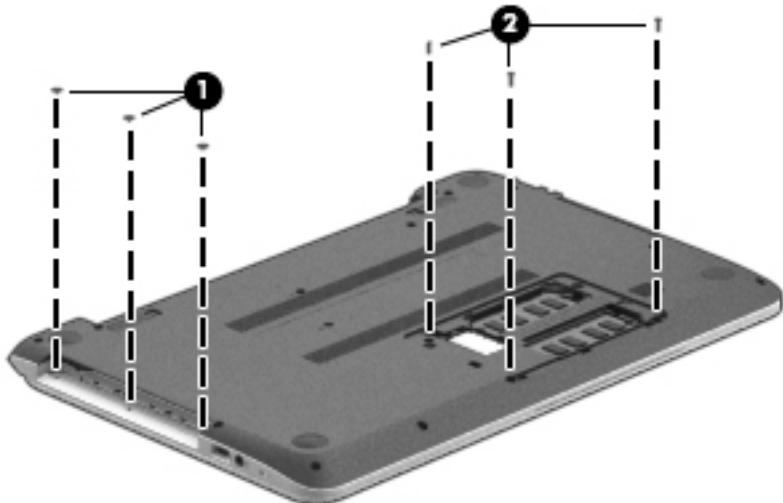
**2.** Disconnect the power button cable **(1)** and the TouchPad cable **(2)**.
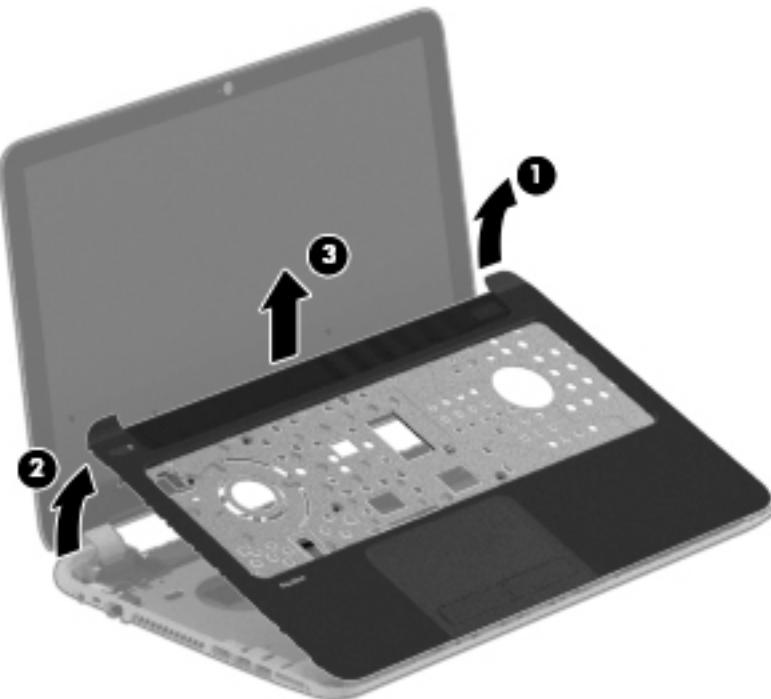
3. Close the display and turn the computer upside down.

4. Remove the eleven Phillips M2.5×6.5 screws from the bottom of the computer.

5. Remove the additional three Phillips M2.0×1.5 screws from the optical drive bay **(1)** and the three Phillips M2.5×6.5 screws from under the service door **(2)**.

6. Turn the computer over and open the display.

7. Gently press on the right upper corner **(1)** where the display hinge and top cover meet. Lift around the edges of the top cover **(2)**. Lift to remove the top cover **(3)**.

When replacing the top cover, be sure that the following components are removed from the defective top cover and installed on the replacement top cover:

- Power button board and cable (see Power button board on page 47).

- Optical drive cable, (see Optical drive on page 33).

- USB/audio board, (see Hard drive on page 44).

Reverse this procedure to install the top cover.

Hard drive

📝 **NOTE:** The hard drive spare part kit includes the hard drive rubber bracket and screws. These components are included in the Hard Drive Hardware Kit, spare part number 732071-001.
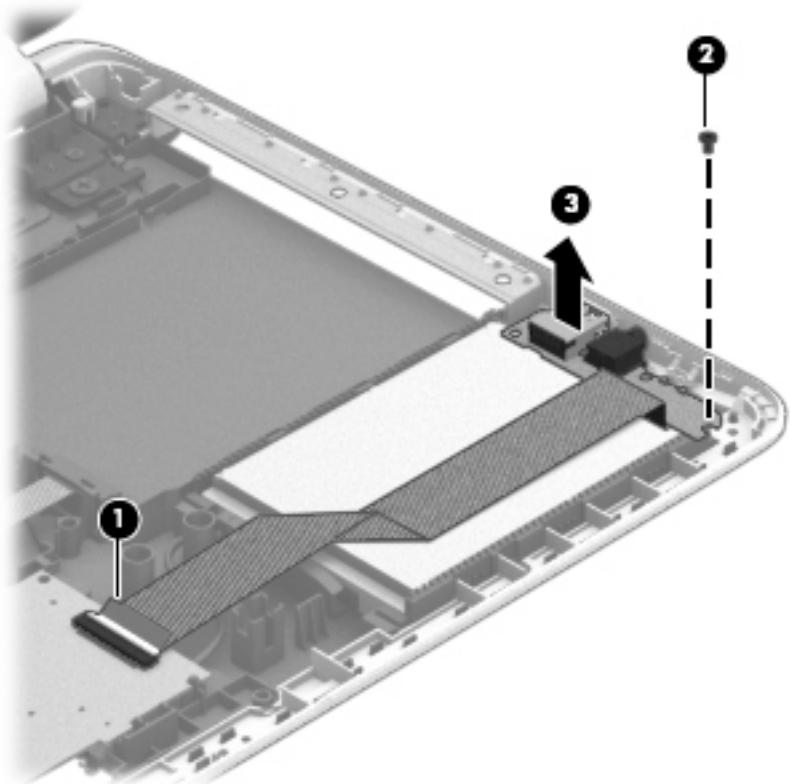
Description	Spare part number
750 GB, 5400 rpm	778190-001
500 GB, 5400 rpm	669299-001
Hard Drive Hardware Kit (not illustrated, includes hard drive rubber bracket, 2 hard drive retention brackets, and hard drive connector cable).	732071-001

Before removing the hard drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

Remove the hard drive:

1. Disconnect the USB/audio cable **(1)** by flipping open the ZIF connector and lifting the cable. Remove the USB/audio cable Phillips M 2.5×3.0 screw **(2)** and then lift the USB/audio board **(3)**.
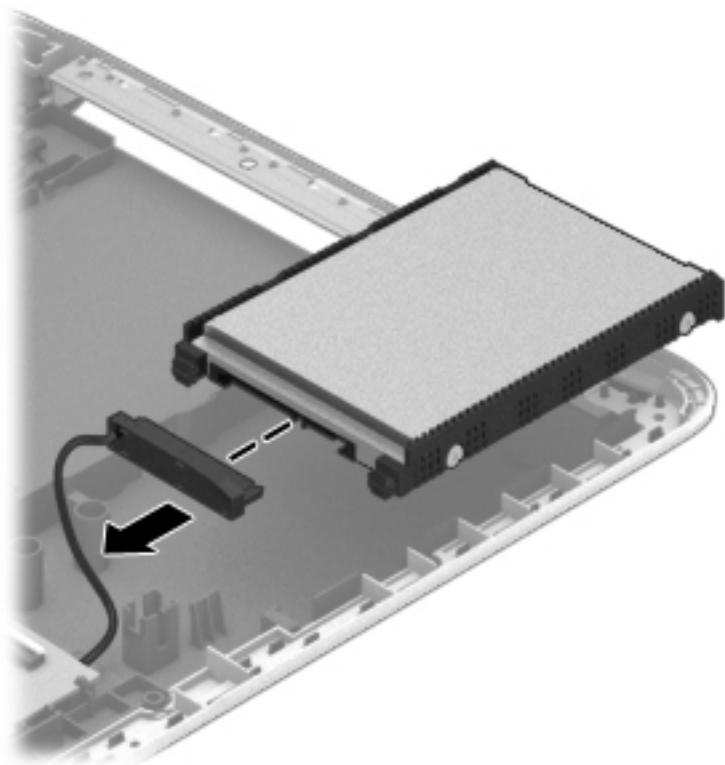
2. Lift the front of the hard drive **(1)** and slide the hard drive **(2)** forward .
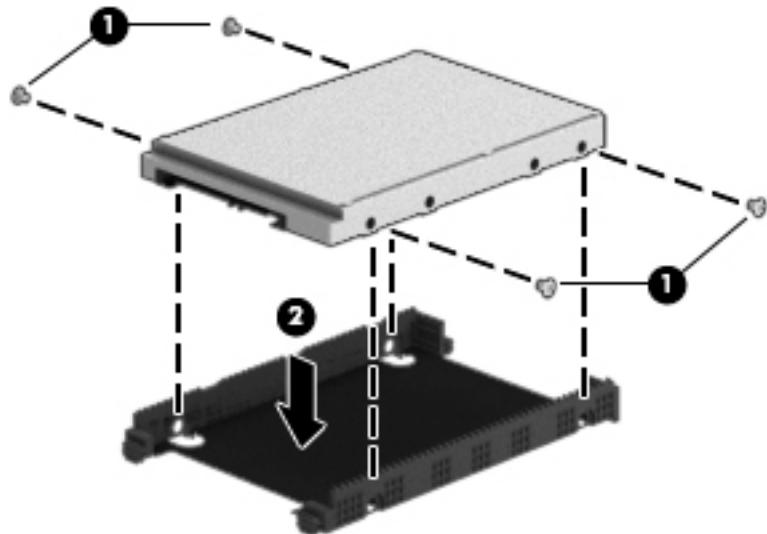
3. Release the hard drive connector cable from the clips.

> **NOTE:** You will disconnect the hard drive connector cable from the system board when you remove the system board.

4. If it is necessary to disassemble the hard drive, perform the following steps:

a. Remove the four Phillips M3.0×3.5 screws **(1)** from the bracket and separate the front edges of the hard drive rubber bracket from the hard drive

b. Disassemblying the hard drive

Reverse this procedure to reassemble and install the hard drive.

Power button board

| Description	Spare part number
Power button board (includes cable)	776780-001
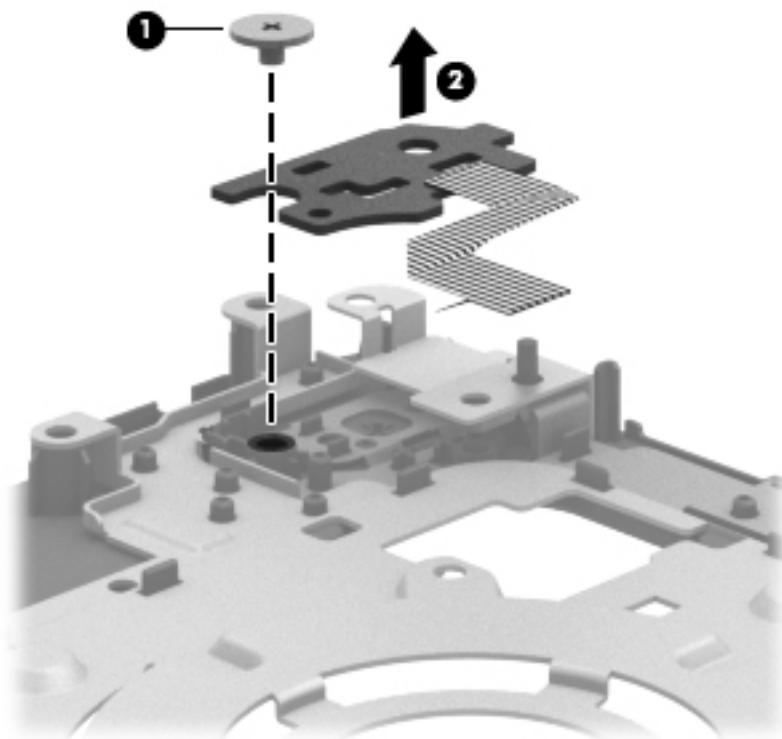
Before removing the power button board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

    a. Optical drive (see Optical drive on page 33).

    b. Service door (see Service door on page 29).

    c. WLAN module (see WLAN module on page 31).

    d. Memory module (see Memory module on page 30).

    e. Keyboard (see Keyboard on page 38).

    f. Top cover (see Top cover on page 40).

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.

2. Remove the Phillips M2.5×2.5 screw **(1)** that secures the power button board to the top cover.

3. Remove the power button board **(2)** with cable (the cable was disconnected from the top cover when removing the top cover).

Reverse this procedure to install the power button board.

TouchPad button board

| Description	Spare part number
TouchPad button board (includes cable)	732078-001
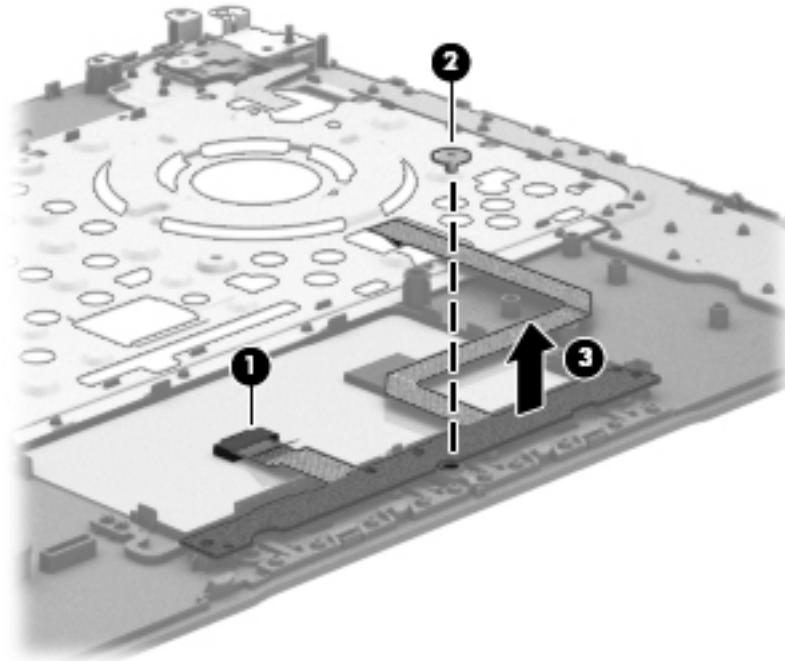
Before removing the TouchPad button board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

Remove the TouchPad button board:

1. Turn the top cover upside down, with the front toward you.

2. Release the TouchPad ZIF connector, and then disconnect the TouchPad button board cable **(1)** from the TouchPad board.

3. Remove the Phillips M2.0×3.5 broadhead screw **(2)** that secures the TouchPad button board bracket to the top cover.

4. Lift up and remove the TouchPad button board **(3)**.

Reverse this procedure to install the TouchPad button board.

Optical drive connector cable
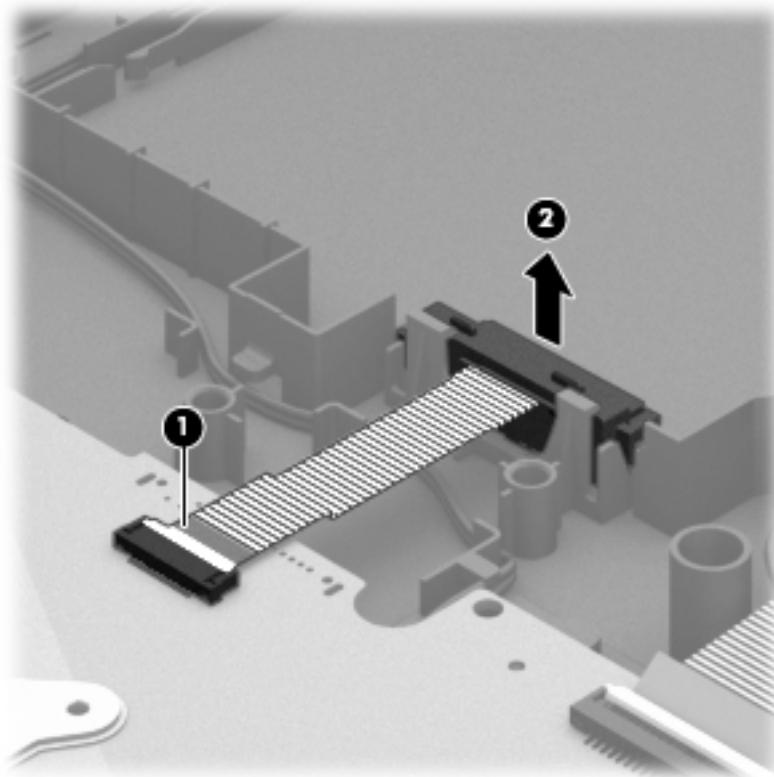
📝 **NOTE:** The optical drive connector cable is included with the optical drive, spare part number 779456-001.

Before removing the optical drive connector cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

    a. Optical drive (see Optical drive on page 33).

    b. Service door (see Service door on page 29).

    c. WLAN module (see WLAN module on page 31).

    d. Memory module (see Memory module on page 30).

    e. Keyboard (see Keyboard on page 38).

    f. Top cover (see Top cover on page 40).

Remove the optical drive connector cable:

1. Disconnect the optical drive connector cable **(1)** from the system board.

2. Release the optical drive connector cable from the clip **(2)** built into the base enclosure.

3. Remove the optical drive connector cable.

Reverse this procedure to install the optical drive connector cable.

System board

NOTE: The system board spare part kit includes replacement thermal material.

Description	Spare part number
All system boards use the following part numbers:	
xxxxxx-001: Non-Windows operating systems	
xxxxxx-501: Windows 8.1 Standard operating system	
xxxxxx-601: Windows 8.1 Professional or Windows 10 operating system	
Models with a hard drive and optical drive:	
System board with Intel Core i3-4030U processor	790202-001, -501
System board with Intel Core i3-4010U processor	782103-001, -501
System board with Intel Core i3-4005U processor	782101-001, -501
System board with Intel Pentium N3540 processor	786901-001, -501
System board with Intel Pentium N3540 processor (eDP models)	828166-001, -601
System board with Intel Pentium N3530 processor	782100-001, -501
System board with Intel Celeron N3150 processor (eDP models)	828169-001, -601
System board with Intel Celeron N3050 processor (eDP mdoels)	828168-001, -601
System board with Intel Celeron N2940 processor	804044-001, -501
System board with Intel Celeron N2940 processor (eDP models)	828165-001, -601
System board with Intel Celeron N2920 processor	792575-001, -501
System board with Intel Celeron N2840 processor	786899-001, -501
System board with Intel Celeron N2840 processor (eDP models)	828164-001, -601
System board with Intel Celeron N2830 processor	779457-001, -501
System board with Intel Celeron N2820 processor	789103-001, -501
System board with Intel Celeron N2815 processor	789101-001, -501
System board with Intel Celeron N2805 processor	787077-001, -501
Models with a hard drive and no optical drive:	
System board with Intel Core i3-4030U processor	790201-001, -501
System board with Intel Core i3-4010U processor	782104-001, -501
System board with Intel Core i3-4005U processor	782102-001, -501
System board with Intel Pentium N3540 processor	786900-001, -501
System board with Intel Pentium N3530 processor	782106-001, -501
System board with Intel Celeron N2920 processor	792574-001, -501
System board with Intel Celeron N2840 processor	786898-001, -501

Description	Spare part number
System board with Intel Celeron N2830 processor	782105-001, -501
System board with Intel Celeron N2820 processor	789102-001, -501
System board with Intel Celeron N2815 processor	789100-001, -501
System board with Intel Celeron N2805 processor	787076-001, -501

Before removing the system board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

   g. Hard drive (see Hard drive on page 44).

When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:
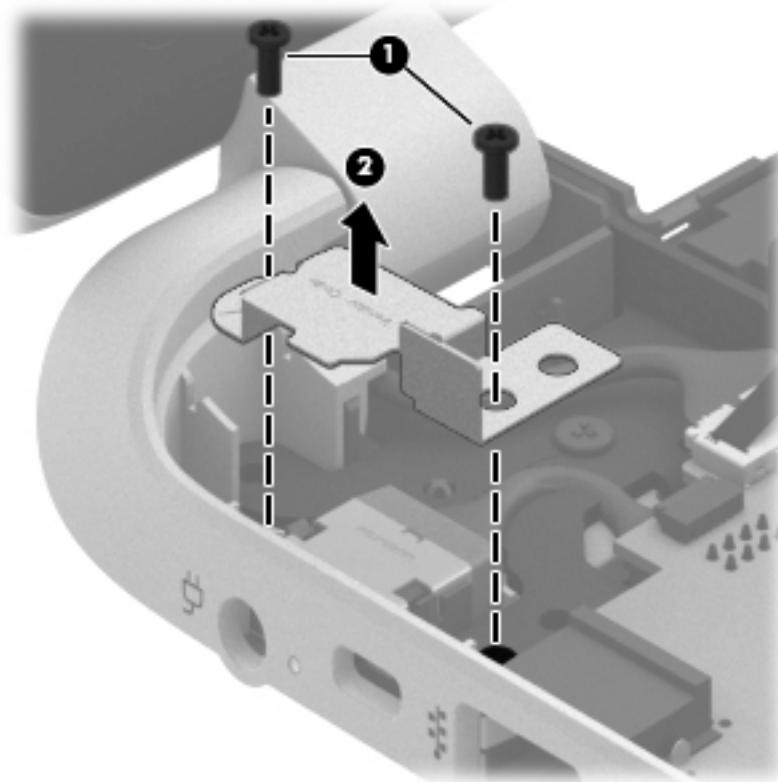
- Hard drive cable

- Power connector cable

- RTC battery (see RTC battery on page 57)

- Fan (see Heat sink assembly on page 61)

- Heat sink assembly (see Heat sink assembly on page 61)

Remove the system board:

1. Disconnect the following cables from the system board:

   (1) Display panel cable

   (2) Speaker cable

   (3) Optical drive connector cable

   **(4)** USB/audio board cable
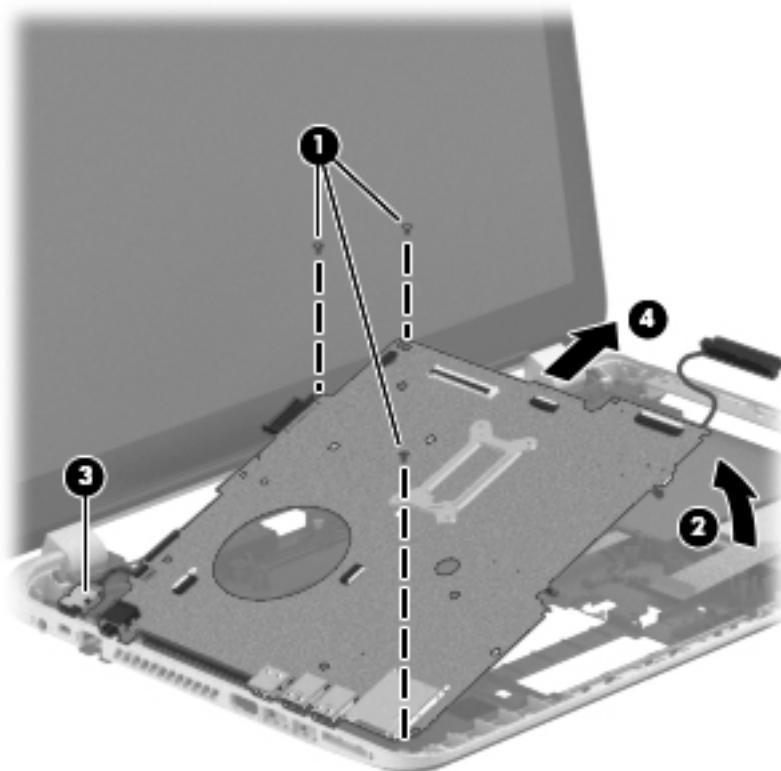
2. Remove the two Phillips M2.5×6.5 and M2.0×5.0 screws **(1)**. Remove the bracket **(2)** that secures the power connector bracket to the base enclosure.
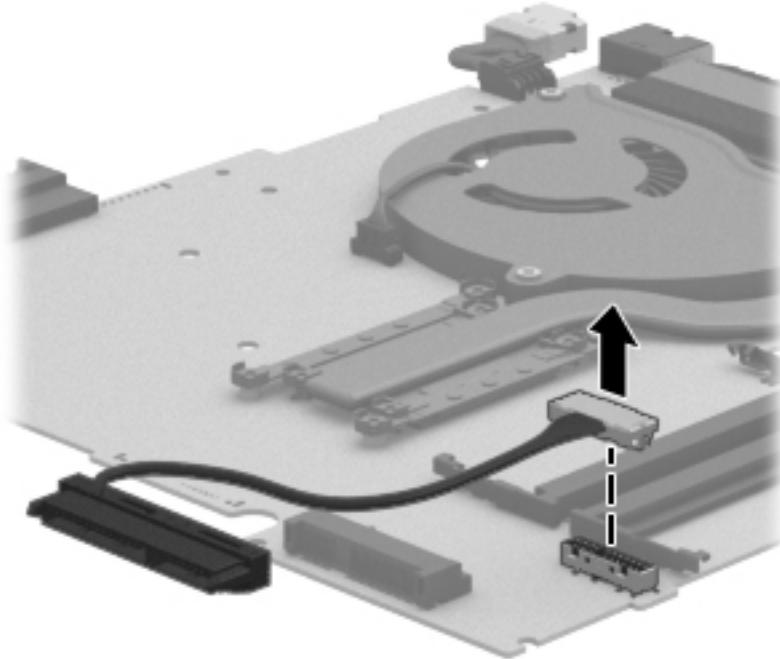

3. Remove the four Phillips M2.5×5.0 screws **(1)** that secure the system board to the base enclosure.

4. Lift the right side of the system board **(2)** until it rests at an angle.

5. Carefully remove from the power connector **(3)**. Remove the system board by sliding it up and to the right at an angle and pull the system board **(4)** carefully to the right.

6. Remove the hard drive connector cable:

    a. Turn the system board upside down, with the front toward you.

b. Disconnect the hard drive connector cable from the system board. The hard drive cable is part of the Hard Drive Hardware Kit, part number 732071-001.

Reverse this procedure to install the system board.

RTC battery

| Description	Spare part number
RTC battery	697917-001
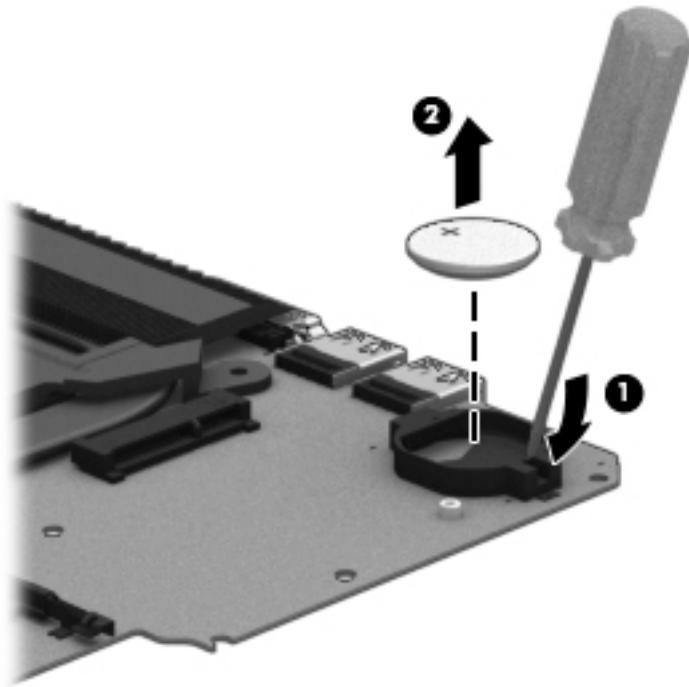
Before removing the RTC battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

    a. Optical drive (see Optical drive on page 33).

    b. Service door (see Service door on page 29).

    c. WLAN module (see WLAN module on page 31).

    d. Memory module (see Memory module on page 30).

    e. Keyboard (see Keyboard on page 38).

    f. Top cover (see Top cover on page 40).

    g. Hard drive (see Hard drive on page 44).

    h. System board (see System board on page 52).

Remove the RTC battery:

1. Use a flat-bladed, non-metallic tool **(1)** to release the RTC battery from the socket on the system board.

2. Remove the RTC battery **(2)**.

Reverse this procedure to install the RTC battery. When installing the RTC battery, make sure the "+" sign faces up.

Fan

Description	Spare part number
Fan	732068-001

NOTE: To properly ventilate the computer, allow at least 7.6 cm (3 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.
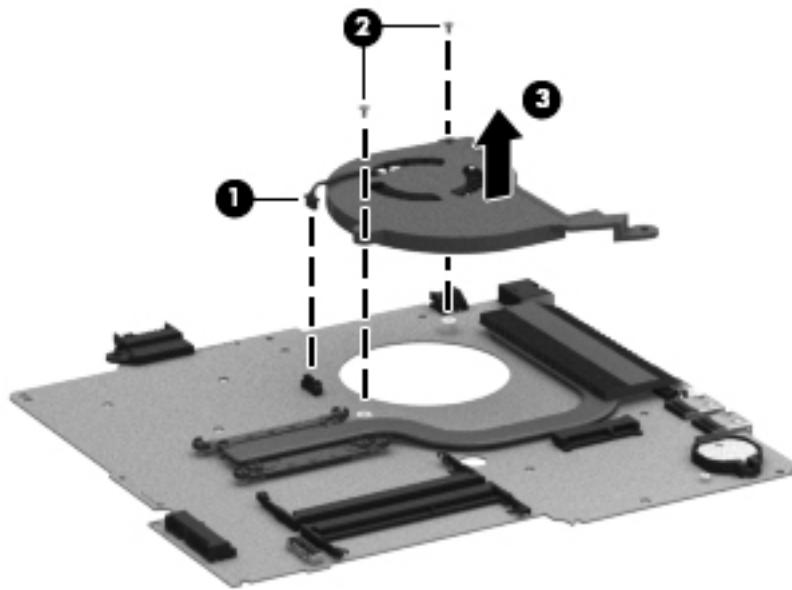
Before removing the fan, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

   g. Hard drive (see Hard drive on page 44).

   h. System board (see System board on page 52).

Remove the fan:

1. Turn the system board upside down, with the front toward you.

2. Disconnect the fan cable **(1)** from the system board.

3. Remove the 2 screws **(2)** that secure the fan to the system board.

4. Remove the fan **(3)** from the system board.

Reverse this procedure to install the fan.

Heat sink assembly

Description	Spare part number
Heat sink for use with Intel Core processors	742581-001
Heat sink for use in computers with Intel Pentium N3540, Celeron N2940, and Celeron N2840 processors	749040-001
Heat sink for use in computers with Intel Celeron N3150 and N3050 processors	828173-001

NOTE: To properly ventilate the computer, allow at least 7.6 cm (3 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.
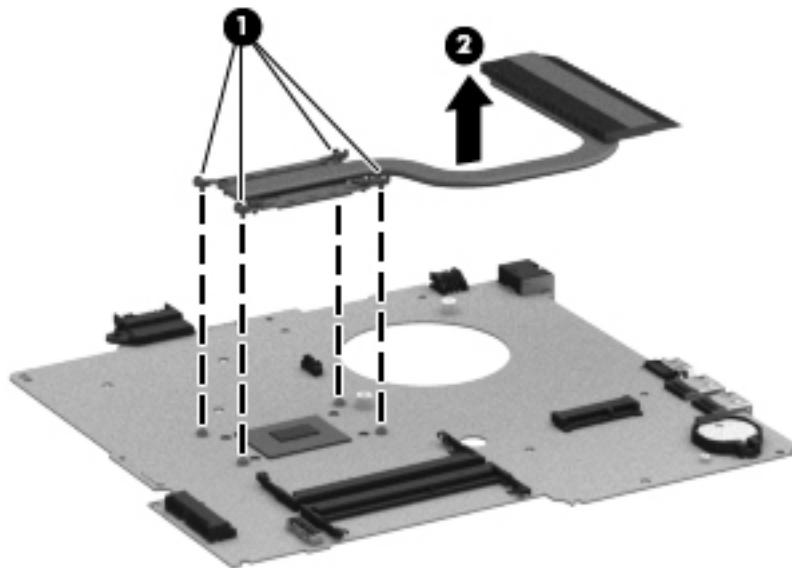
Before removing the fan/heat sink assembly, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

   g. Hard drive (see Hard drive on page 44).

   h. System board (see System board on page 52).

Remove the heat sink assembly:
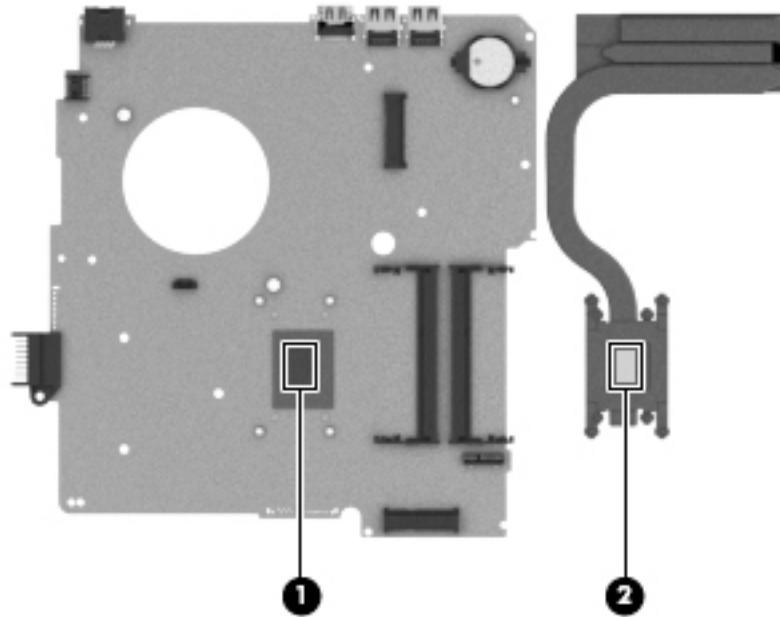
1. Turn the system board upside down, with the front toward you.

2. Disconnect the fan cable from the system board.

3. Following the 1, 2, 3, 4 sequence stamped into the fan/heat sink assembly, loosen the four Phillips M2.0×10.0 captive screws **(1)** that secure the fan/heat sink assembly to the system board.

4. Remove the heat sink assembly **(2)**.

Thoroughly clean the thermal connections **(1)** on the system board and the heat sink **(2)** before replacing a heat sink onto a system board.

📝 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with a graphics subsystem with UMA memory. Thermal paste is used on the processor **(1)** and the fan/heat sink assembly section **(2)** that services it.

5. Reverse this procedure to install the fan/heat sink assembly. Replace the thermal material that ships with the replacement heat sink.

Power connector cable

Description	Spare part number
Power connector cable (includes bracket)	732067-001

Before removing the power connector cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

   g. Hard drive (see Hard drive on page 44).

   h. System board (see System board on page 52).

Remove the power connector board:

NOTE: The power connector bracket was removed when removing the system board.

1. Turn the system board upside down, with the front toward you.

2. Release the power connector from the clip built into the system board.

Reverse this procedure to install the power connector cable.

Speakers
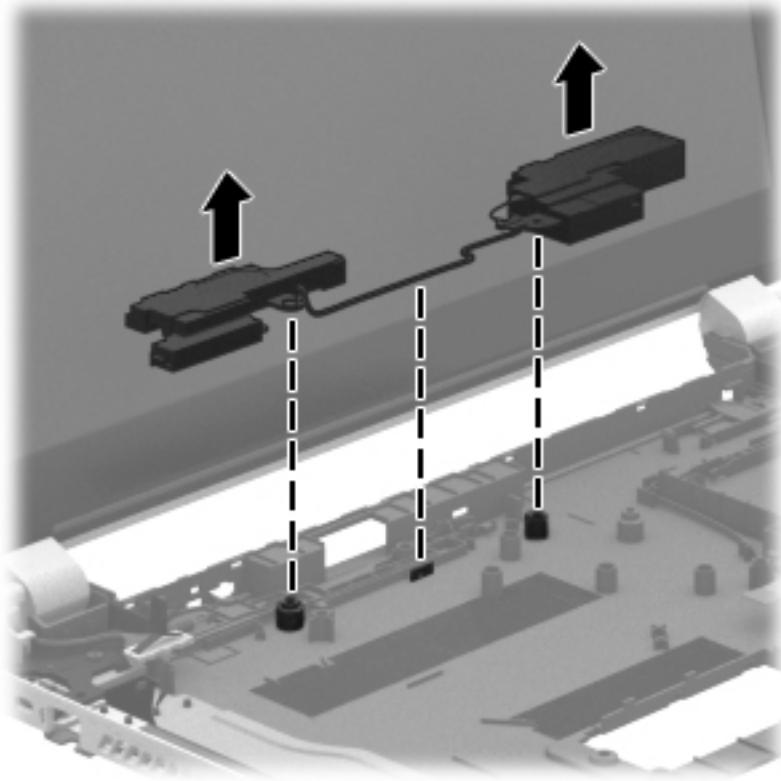
Description	Spare part number
Speakers (include, speaker cable, and 4 rubber isolators)	732084-001

Before removing the speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

    a. Optical drive (see Optical drive on page 33).

    b. Service door (see Service door on page 29).

    c. WLAN module (see WLAN module on page 31).

    d. Memory module (see Memory module on page 30).

    e. Keyboard (see Keyboard on page 38).

    f. Top cover (see Top cover on page 40).

    g. Hard drive (see Hard drive on page 44).

   h. System board (see System board on page 52).

Remove the speakers:

▲ Remove the speakers by lifting up on the clip on the right side speaker and lifting the speakers. Carefully and gently lift the speaker wire connecting the left and right speakers.

📝 **NOTE:** The speaker connection cable was removed when removing the system board.

📝 **NOTE:** The speakers include rubber isolators that are installed in the screw holes. These isolators are crucial to the performance of the speakers.

Reverse this procedure to install the speaker.

Display assembly

Description	Spare part number
Display assembly, ltouch screen	783120-001
Display assembly, touch screen with HD webcam	790204-001
Display assembly, touch screen, eDP	828162-001
Display bezel (includes 2 rubber screws)	776774-001
Display panel, raw (HD, BrightView)	732080-001
Display panel, raw (HD, BrightView, eDP)	828163-001
Webcam/microphone module (includes adhesive)	776787-001
Webcam/microphone module, HD(includes adhesive)	790203-001
Display panel cable for use in models without eDP displays (includes webcamera/microphone module cable and two rubber screws)	732066-001
Display panel cable for use in models with eDP displays (includes webcamera/microphone module cable and two rubber screws)	828161-001
Antenna Kit (includes left and right wireless antenna cables and transceivers and 2 rubber screws)	776770-001
Display Hinge Kit (includes 2 rubber screws):	732072-001
Display enclosure for use in black models (includes 2 rubber screw covers)	776771-001

Description	Spare part number
Display enclosure for use in red models (includes 2 rubber screw covers)	832757-001
Display enclosure for use in silver models (includes 2 rubber screw covers)	836862-001

NOTE: The display assembly is spared both together and at the subcomponent level. For more display assembly spare part information, see the individual removal subsections.
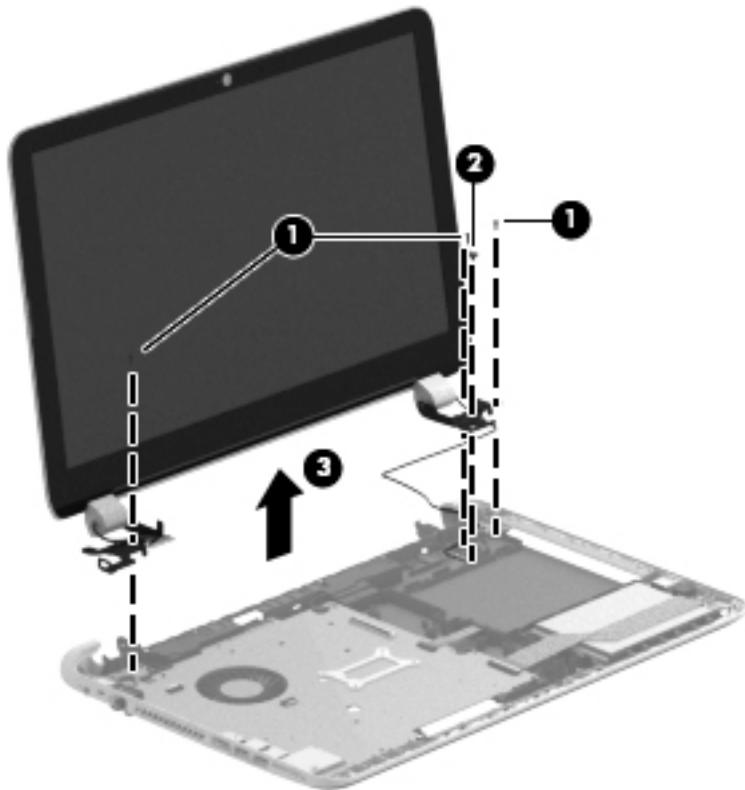
Before removing the display assembly, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 28), and then remove the following components:

   a. Optical drive (see Optical drive on page 33).

   b. Service door (see Service door on page 29).

   c. WLAN module (see WLAN module on page 31).

   d. Memory module (see Memory module on page 30).

   e. Keyboard (see Keyboard on page 38).

   f. Top cover (see Top cover on page 40).

   g. Hard drive (see Hard drive on page 44).

   h. System board (see System board on page 52).

Remove the display assembly:

1. Remove the three Phillips M2.5×5.0 screws **(1)** and Phillips M2.5×2.5 broadhead screw **(2)** that secures the display assembly to the base enclosure.

2. Remove the display assembly **(3)**.
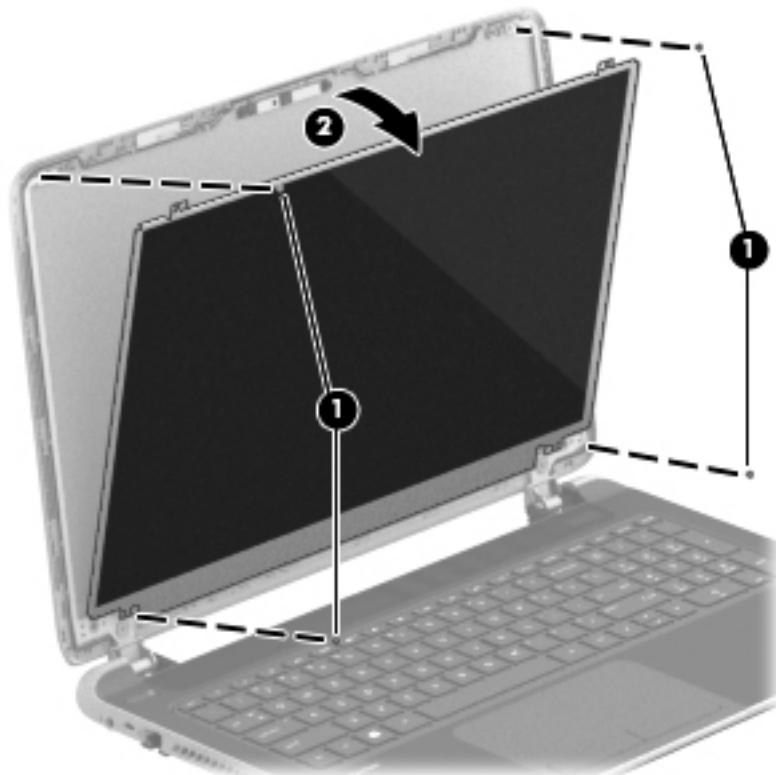
3. If it is necessary to replace the display bezel or any of the display assembly subcomponents:

    a. Remove the two display bezel screw covers **(1)** and the two Phillips M2.5×5.0 screws **(2)** that secure the display bezel to the display assembly. The display bezel screw covers are included in the display bezel spare part kit, spare part number 676644-001, and in all display assembly subcomponent spare part kits.

    b. Flex the inside edges of the bottom edge **(3)**, the left and right sides **(4)**, and the top edge **(5)** of the display bezel until the bezel disengages from the display enclosure.

    c. Remove the display bezel **(6)**. The display bezel is available using spare part number 776774-001.
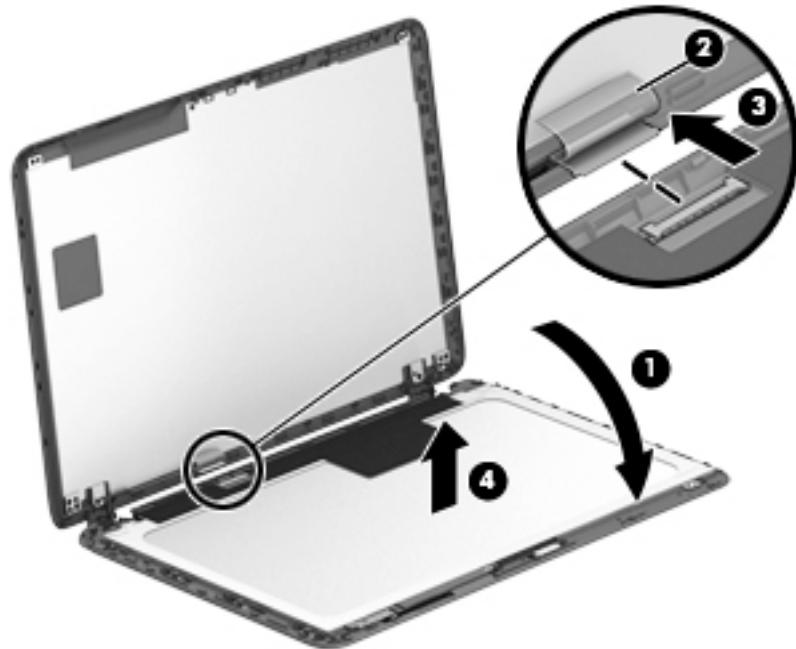
CAUTION: Be sure the work surface is clear of all tools, screws, and computer components before turning the display panel upside down on the work surface.

4. If it is necessary to replace the display panel:

   a. Remove the four Phillips M2.0×3.5 screws **(1)** that secure the display panel to the display enclosure.

   b. Lift the top edge of the display panel **(2)** and turn the display panel upside down.
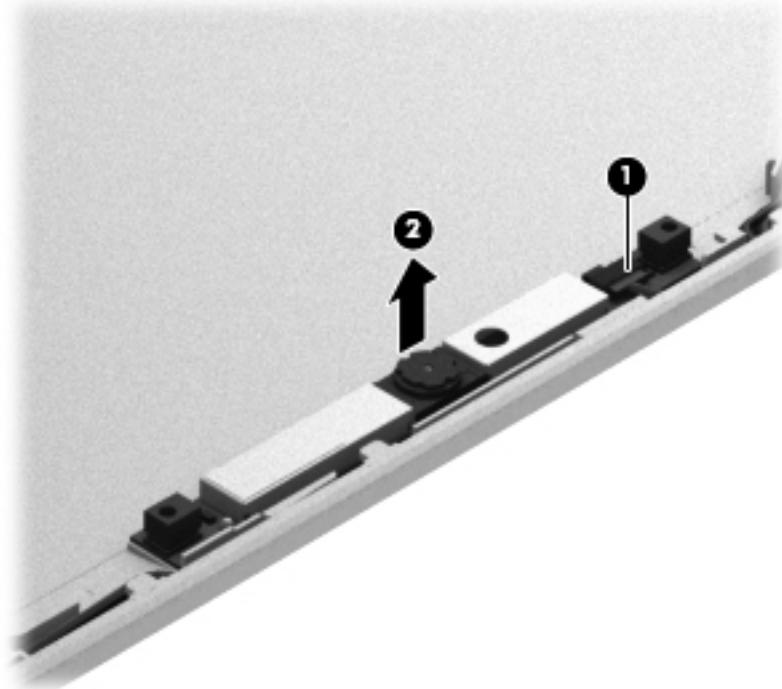
   c. Release the connector **(1)** that secures the display panel cable connector to the display panel.

**d.** Disconnect the display panel cable **(2)** from the display panel and remove the panel **(3)**.
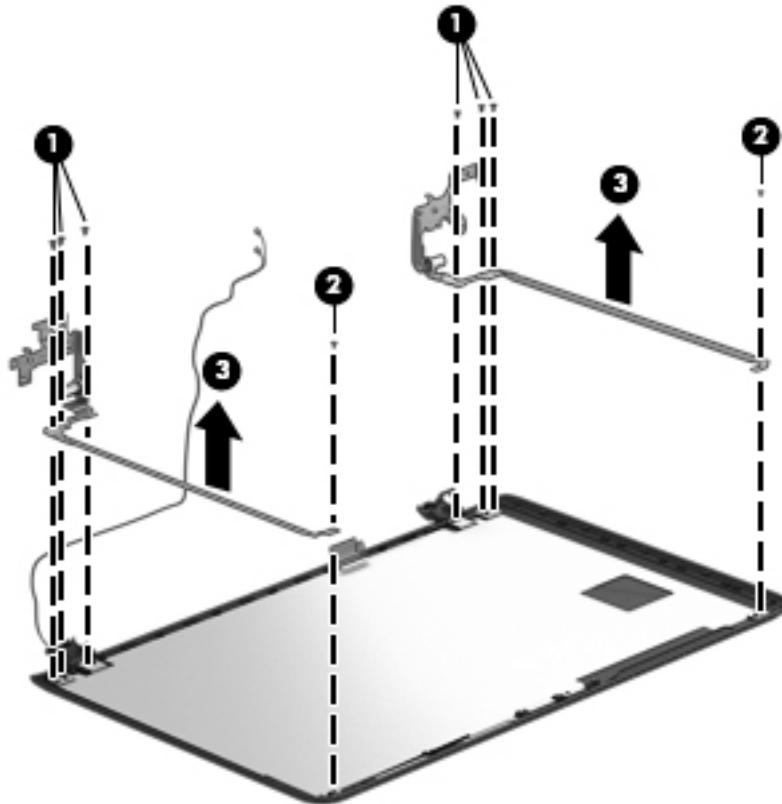
5. If it is necessary to replace the webcamera/microphone module:

a. Disconnect the webcamera/microphone module cable **(1)** from the webcamera/microphone module. (The webcamera/microphone module cable is part of the display panel cable.)

**b.** Detach the webcamera/microphone module **(2)** from the display enclosure.
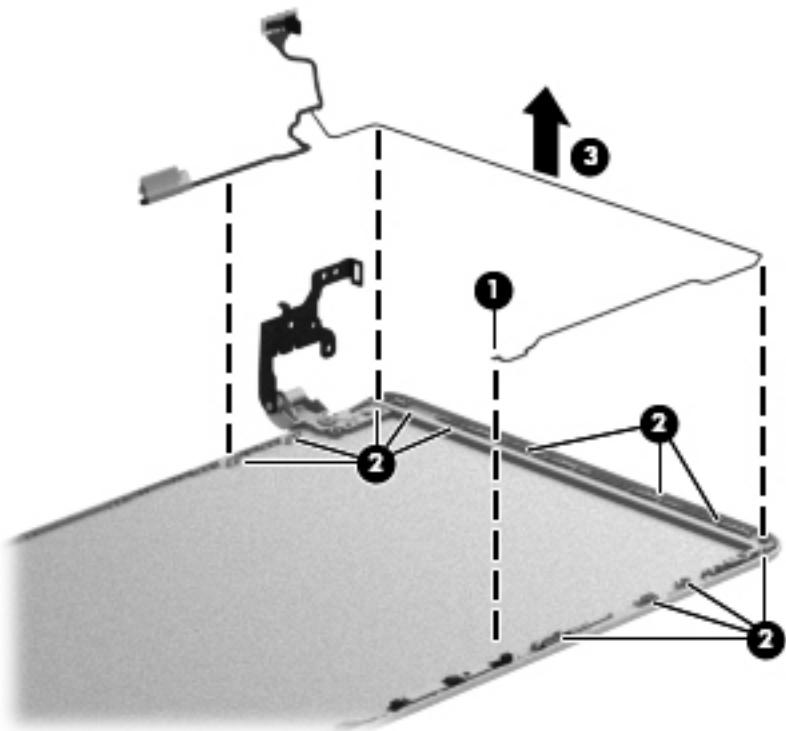
6. If it is necessary to replace the hinges:

a. Remove the four Phillips M2.5×4.0 screws **(1)** and **(2)** that secure the hinges to the display enclosure.

b. Remove the hinges and brackets **(3)** from the display enclosure.
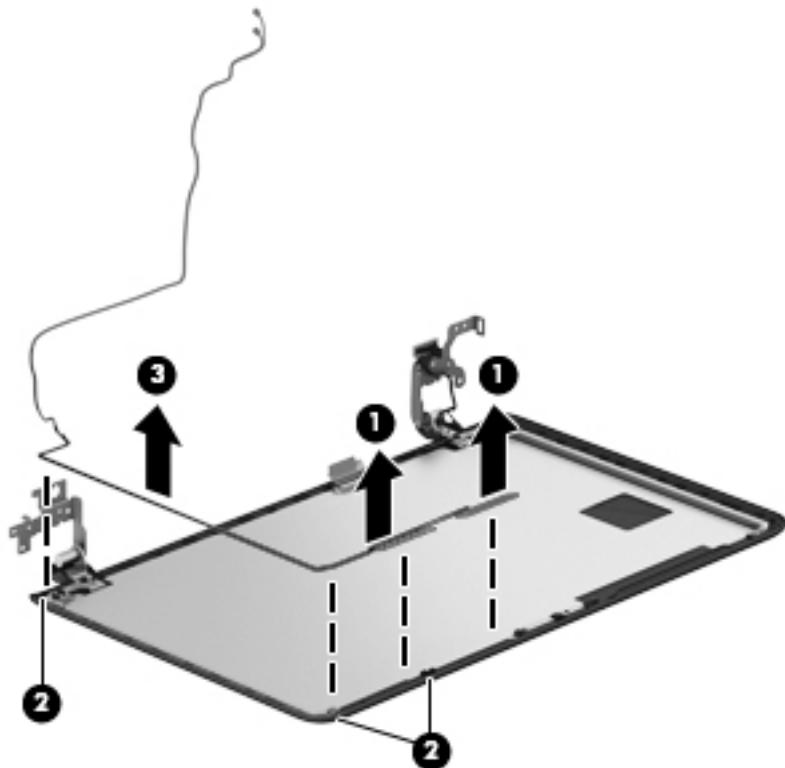

7. If it is necessary to replace the display panel cable:

a. Release the display panel cable from the clips **(1)** and routing channel built into the display enclosure.

b. Carefully release the cable from the channel guides **(2)** and remove the display panel cable **(3)**.

8. If it is necessary to replace the wireless antenna cables and transceivers:

   a. Release the wireless antenna transceivers **(1)** from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)

   b. Release the wireless antenna cables from the clips **(2)** built into the display enclosure.

c. Remove the wireless antenna cables and transceivers **(3)**. The wireless antenna cables and transceivers are available in the Antenna Kit, spare part number 776770-001.

Reverse this procedure to install the display assembly.

7 Using Setup Utility (BIOS) in Windows 8.1

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

Starting Setup Utility (BIOS)

CAUTION: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

▲ Turn on or restart the computer, quickly press esc, and then press f10.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs.*

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than the one currently installed on the computer, you need to know the version of the system BIOS that is installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be revealed from the Start screen by typing `support`, selecting the **HP Support Assistant** app, selecting **My computer**, and then selecting **System Information**, or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 73).

2. Select **Main**, and then make note of your BIOS version.

3. Select **Exit**, select **Exit Discarding Changes**, and then follow the on-screen instructions.

Downloading a BIOS update

CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

● Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

● Do not shut down the computer or initiate Sleep.

● Do not insert, remove, connect, or disconnect any device, cable, or cord.

NOTE: If your computer is connected to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

1. From the Start screen, type `support`, and then select the **HP Support Assistant** app.

    – or –

    From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.

3. Follow the on-screen instructions.

4. At the download area, follow these steps:

    a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

    b. Follow the on-screen instructions to download your selection to the hard drive.

        If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

BIOS installation procedures vary. Follow any instructions that appear on the screen after the download is complete. If no instructions appear, follow these steps:

1. From the Start screen, type `file`, and then select **File Explorer**.

    – or –

    From the Windows desktop, right-click the **Start** button, and then select **File Explorer**.

2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename*.exe).

    The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

📝 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

8 Using Setup Utility (BIOS) in Windows 10

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

NOTE: To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook. The on-screen keyboard, which displays in tablet mode, cannot access Setup Utility.

Starting Setup Utility (BIOS)

⚠ CAUTION: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

NOTE: To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook. The on-screen keyboard, which displays in tablet mode, cannot access Setup Utility.

- Computers or tablets with keyboards:
  - ▲ Turn on or restart the computer, quickly press esc, and then press f10.
- Tablets without keyboards:
  1. Turn on or restart the tablet, and then quickly hold down the volume down button.

     - or -

     Turn on or restart the tablet, and then quickly hold down the Windows button.
  2. Tap **f10**.

Updating Setup Utility (BIOS)

Updated versions of Setup Utility (BIOS) may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To decide whether you need to update Setup Utility (BIOS), first determine the BIOS version on your computer.

To reveal the BIOS version information (also known as *ROM date* and *System BIOS*):

1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

   – or –

Click the question mark icon in the taskbar.

2. Select **My PC**, and then select **Specifications**.

– or –

▲ Use Setup Utility (BIOS).

To use Setup Utility (BIOS):

1. Start Setup Utility (BIOS) (see).

2. Select **Main**, select System Information, and then make note of the BIOS version.

3. Select **Exit**, select **No**, and then follow the on-screen instructions.

To check for later BIOS versions, see .

Downloading a BIOS update

⚠ **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

● Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

● Do not shut down the computer or initiate Sleep.

● Do not insert, remove, connect, or disconnect any device, cable, or cord.

📝 **NOTE:** If your computer is connected to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

– or –

Click the question mark icon in the taskbar.

2. Click **Updates**, and then click **Check for updates and messages**.

3. Follow the on-screen instructions.

4. At the download area, follow these steps:

a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

b. Follow the on-screen instructions to download your selection to the hard drive.

Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

BIOS installation procedures vary. Follow any instructions that appear on the screen after the download is complete. If no instructions appear, follow these steps:

1. Type `file` in the taskbar search box, and then select **File Explorer**.

2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Synchronizing a tablet and keyboard (select products only)

For a tablet with a detachable keyboard, when you attach the tablet to the keyboard and restart the computer, Setup Utility (BIOS) checks to see if the Embedded Controller firmware on the keyboard needs to be synchronized. If so, synchronization begins. If the synchronization is interrupted, a notification screen displays for 10 seconds before the tablet restarts and attempts to synchronize again.

NOTE: The Embedded Controller firmware will synchronize ONLY if the tablet or keyboard battery is more than 50% charged, or if your tablet is connected to AC power.

9 Backing up, restoring, and recovering in Windows 8.1

This chapter provides information about the following processes. The information in the chapter is standard procedure for most models.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP Support Assistant.

▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app.

- or -

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select models only. Choose the available method according to your computer model.

- Use HP Recovery Manager after you successfully set up the computer to create HP Recovery media. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select models only) on page 78. For information on the recovery options that are available using the recovery media, see Recovering using HP Recovery Manager on page 80.

- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Using Windows tools on page 79.

  📝 **NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

Creating HP Recovery media (select models only)

📝 **IMPORTANT:** If your computer does not list a Recovery Media Creation option, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

HP Recovery Manager is a software program that allows you to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and the software programs installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.

- HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.

- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.

- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub.

- Be sure that the computer is connected to AC power before you begin creating the recovery media.

- The creation process can take an hour or more. Do not interrupt the creation process.

- If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue, and the remaining discs will be burned.

To create HP Recovery media:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

2. Select **Recovery Media Creation**, and then follow the on-screen instructions.

If you ever need to recover the system, see .

Using Windows tools

You can create system restore points and create backups of personal information using Windows tools.

📝 **NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

▲ From the Start screen, type `help`, and then select **Help and Support**.

– or –

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

For more information and steps, see Help and Support.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

📝 **IMPORTANT:** Not all methods are available on all models.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see Help and Support.

▲ From the Start screen, type support, and then select the **HP Support Assistant** app.

- or -

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

● If you need to correct a problem with a preinstalled application or driver, use the Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

▲ From the Start screen, type recovery, select **HP Recovery Manager**, select **Drivers and Applications Reinstall**, and then follow the on-screen instructions.

● On select models, if you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition or HP Recovery media. Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Drivers and Applications Reinstall option in HP Recovery Manager.

For more information, see Recovering using HP Recovery Manager on page 80.

● If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select models only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 80. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 78.

● On select models, if you want to recover the computer's original factory partition and content , or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 80.

● On select models, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

For more information, see Removing the HP Recovery partition (select models only) on page 82.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from support, or by using the HP Recovery partition (select models only). If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 78.

What you need to know before you get started

● HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

> **IMPORTANT:** Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

● HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 78.

● To use the Factory Reset option (select models only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 78.

● If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP

website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

NOTE: Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.

- Minimized Image Recovery (select models only)—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.

- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select models only) allows System Recovery and Minimized Image Recovery (select models only).

Using the HP Recovery partition (select models only)

The HP Recovery partition allows you to perform a system recovery or minimized image recovery (select models only) without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

1. From the Start screen, type `recovery`, select **HP Recovery Manager**, and then select **HP Recovery Environment**.

    - or-

    Press f11 while the computer boots, or press and hold f11 as you press the power button.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.

2. Insert the HP Recovery media, and then restart the computer.

    NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 81.

3. Follow the on-screen instructions.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection for an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media.

2. Start Computer Setup:

   ▲ Turn on or restart the computer, quickly press esc, and then press f9 for boot options.

3. Select the optical drive or USB flash drive from which you want to boot.

4. Follow the on-screen instructions.

Removing the HP Recovery partition (select models only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you can no longer use the Windows Refresh option or the Windows option to remove everything and reinstall Windows. In addition, you will not be able to perform System Recovery or Minimized Image Recovery from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select models only) on page 78.

Follow these steps to remove the HP Recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

10 Backing up, restoring, and recovering in Windows 10

This chapter provides information about the following processes. The information in the chapter is standard procedure for most products.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP support assistant app.

▲ Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

– or –

Click the question mark icon in the taskbar.

IMPORTANT: If you will be performing recovery procedures on a tablet, the tablet battery must be at least 70% charged before you start the recovery process.

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning any recovery process.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your computer model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select products only) on page 83. For information on the recovery options that are available using the recovery media, see Using Windows tools on page 84.

- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Recovering using HP Recovery Manager on page 85.

  NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

Creating HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. From the **Start** menu, select **File Explorer**, and then select **This PC**.

- If your computer does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

You can use Windows tools to create system restore points and create backups of personal information, see Using Windows tools on page 84.

- If your computer does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

  ◦ Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.

  ◦ HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.

  ◦ To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.

  ◦ If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create DVD media yourself, you can obtain recovery discs for your computer from HP. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

  ◦ Be sure that the computer is connected to AC power before you begin creating the recovery media.

  ◦ The creation process can take an hour or more. Do not interrupt the creation process.

  ◦ If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media:

📝 **IMPORTANT:** For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps.

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.

2. Select **Create recovery media**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 85.

Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

📝 **NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see the Get started app.

▲ Select the **Start** button, and then select the **Get started** app.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

📝 **IMPORTANT:** Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see the Get started app.

  ▲ Select the **Start** button, and then select the **Get started** app.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.

  ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 85. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 83.

- On select products, if you want to recover the computer's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 85.

- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select products only) on page 87.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 83.

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

  📝 **IMPORTANT:** Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 83.

- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 83.

- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP

website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

NOTE: Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.

- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

Using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps (select products only).

1. Type recovery in the taskbar search box, select **Recovery Manager**, and then select **HP Recovery Environment**.

   - or-

   For computers or tablets with keyboards attached, press f11 while the computer boots, or press and hold f11 as you press the power button.

   For tablets without keyboards:

   Turn on or restart the tablet, and then quickly hold down the volume down button; then select f11.

   - or -

   Turn on or restart the tablet, and then quickly hold down the Windows button; then select f11.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.

2. Insert the HP Recovery media, and then restart the computer.

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 87.

3. Follow the on-screen instructions.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection to an optical drive or a USB flash drive.

To change the boot order:

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps.

1.   Insert the HP Recovery media.

2.   Access BIOS:

   For computers or tablets with keyboards attached:

   ▲   Turn on or restart the computer or tablet, quickly press esc, and then press f9 for boot options.

   For tablets without keyboards:

   ▲   Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f9**.

      - or -

      Turn on or restart the tablet, and then quickly hold down the Windows button; then select **f9**.

3.   Select the optical drive or USB flash drive from which you want to boot.

4.   Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select products only) on page 83.

NOTE: The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1.   Type recovery in the taskbar search box, and then select **HP Recovery Manager**.

2.   Select **Remove Recovery Partition**, and then follow the on-screen instructions.

11   Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

NOTE: To start BIOS on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached to your tablet. The on-screen keyboard, which displays in tablet mode, cannot access BIOS.

To start HP PC Hardware Diagnostics UEFI:

1.   Start BIOS:

   ● Computers or tablets with keyboards:

      ▲ Turn on or restart the computer, quickly press esc.

   ● Tablets without keyboards:

      ▲ Turn on or restart the tablet, and then quickly hold down the volume down button.

         - or -

         Turn on or restart the tablet, and then quickly hold down the Windows button.

2.   Press or tap f2.

   The BIOS searches three places for the diagnostic tools, in the following order:

   a.   Connected USB drive

   NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 89.

   b.   Hard drive

   c.   BIOS

3.   When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions. On a tablet, press the volume down button to stop a diagnostic test.

NOTE: If you need to stop a diagnostic test on computers or tablets with a keyboard, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

There are two options to download HP PC Hardware Diagnostics to a USB device:

Download the latest UEFI version:

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.

2. In the HP PC Hardware Diagnostics section, click the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product:

1. Go to http://www.hp.com/support, and then select your country. The HP Support page is displayed.

2. Click **Drivers & Downloads**.

3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.

4. Select your computer, and then select your operating system.

5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

12 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	**38.56 cm**	15.18 in
Depth	**25.8 cm**	10.15 in
Height (front to back)	**2.26 cm**	.89 in
Weight	**2.09 or 2.29 kg** (depending on configuration)	4.61 lb or 5.05 (depending on configuration)
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W	
	19 V dc @ 4.62 A – 90 W	
	19.5 V dc @ 2.31 – 45 W (select models only)	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.

15.6-inch display specifications

	Metric	U.S.
Dimensions		
Height	**20.77 cm**	8.175 in
Width	**37.78 cm**	14.875 in
Diagonal	**39.62 cm**	15.6 in

	Metric	U.S.
Number of colors	Up to 16.8 million	
Contrast ratio	500:1 (typical)	
Brightness	200 nits	
Pixel resolution		
Pitch	0.252mm x 0.252mm	
Format	1366×768	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	2.0 W	
Viewing angle	±65° horizontal, ±50° vertical (typical)	

Hard drive specifications

	750 GB*	500 GB*
Dimensions		
Height	9.5 or 7 mm	9.5 mm
Width	70 mm	70 mm
Weight	107 g max	107 g max
Interface type	SATA	SATA
Transfer rate	300 MB/sec	300 MB/sec
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	1.2 ms	1.5 ms
Average	11.0 ms	12.0 ms
Maximum	21.0 ms	22.0 ms
Logical blocks	1,464,271,578	976,752,240
Disk rotational speed	5400 rpm	5400 rpm
Operating temperature	**5°C to 55°C** (41°F to 131°F)	**5°C to 55°C** (41°F to 131°F)

*Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

NOTE: Certain restrictions and exclusions apply. Contact support for details.

13 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC, or from 220 to 240 volts AC.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries and regions must meet the requirements of the country or region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).

- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.

- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.

- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	COC	5
South Korea	EK	4

Country/region	Accredited agency	Applicable note number
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

14 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.

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